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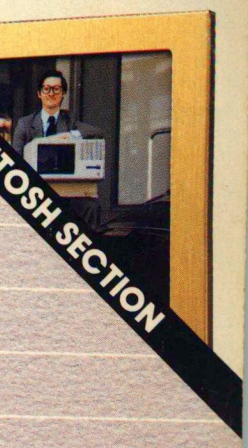
JULY 1984

VOLUME 2
ISSUE 7

A+

THE INDEPENDENT GUIDE FOR **APPLE** COMPUTING



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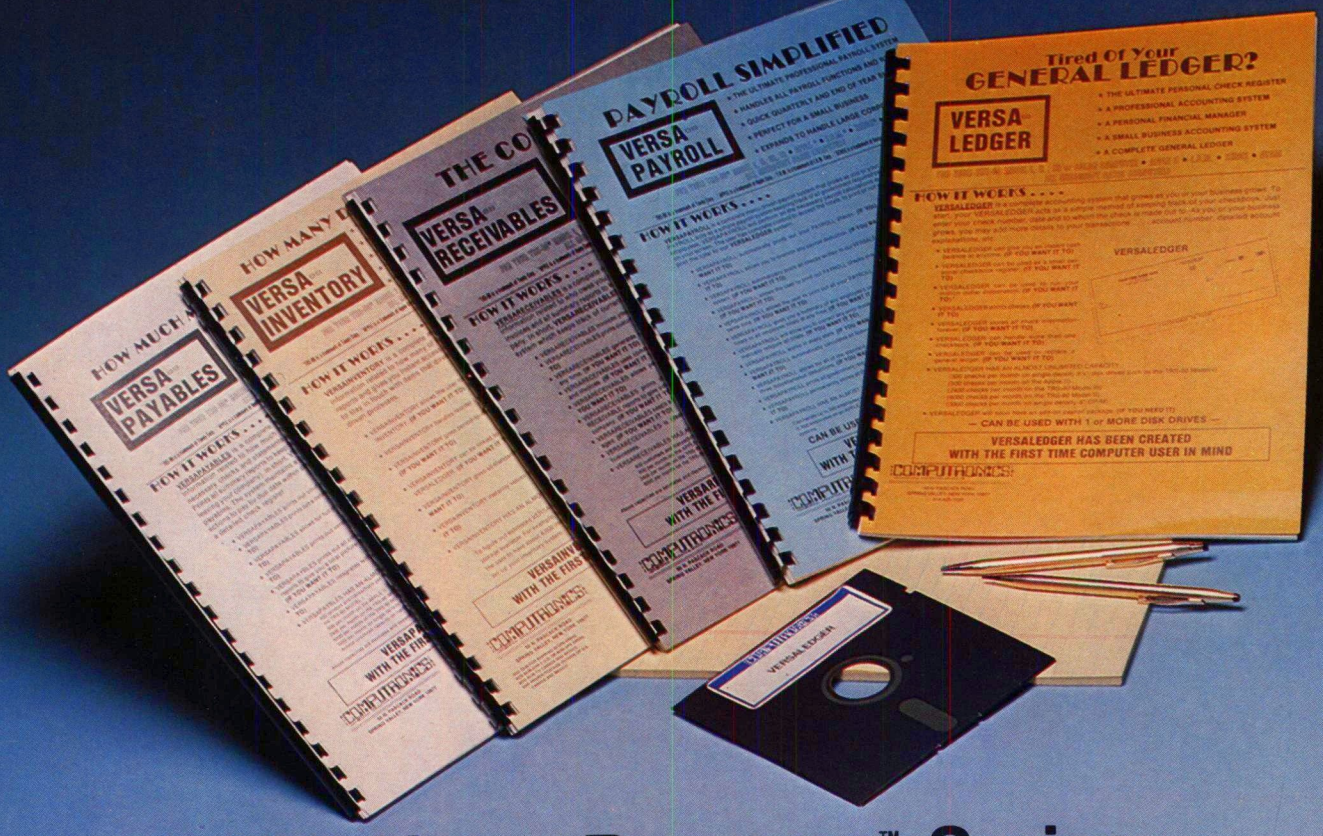

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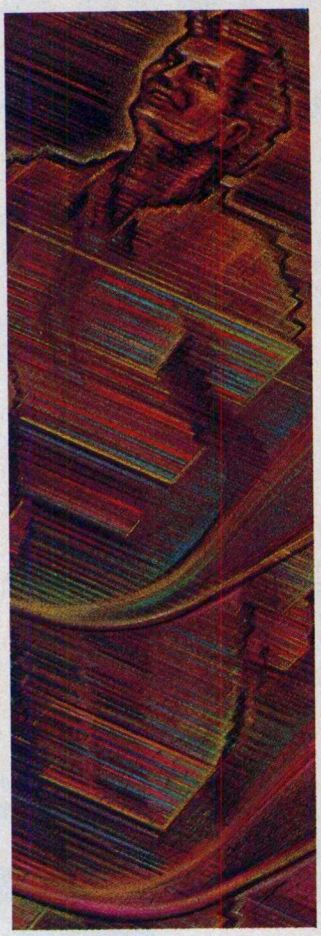

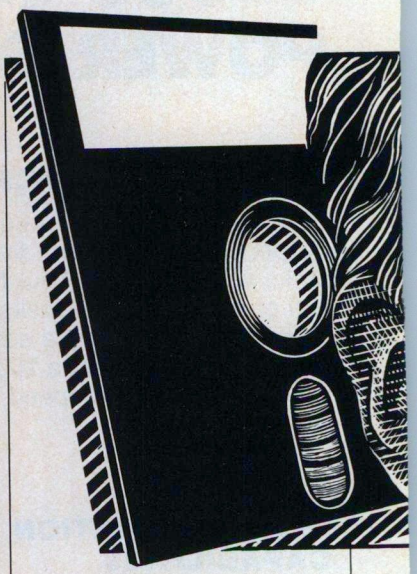

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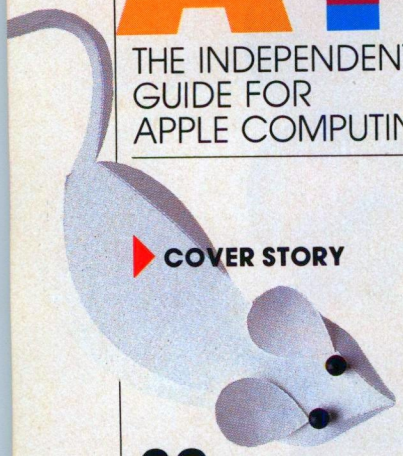

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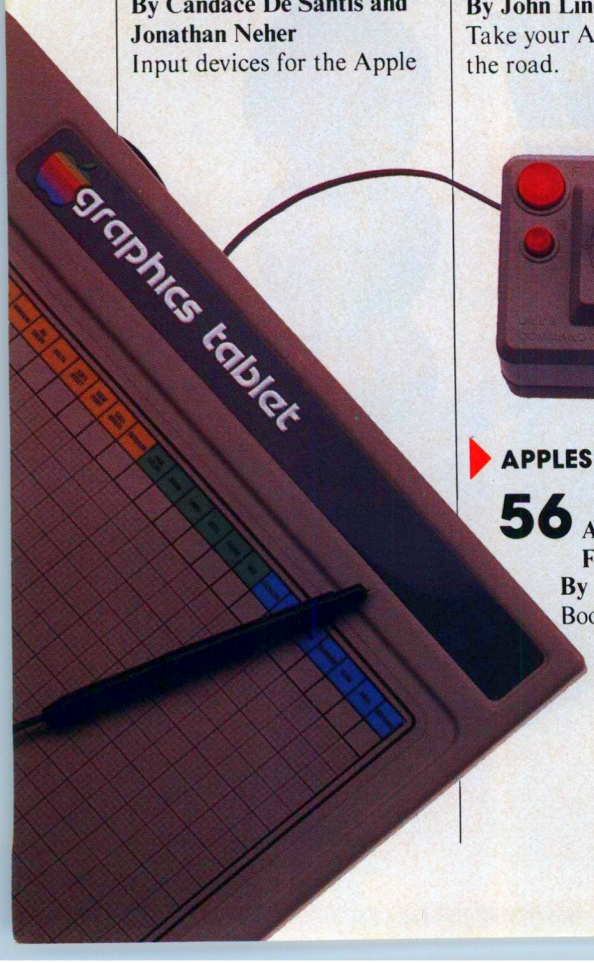

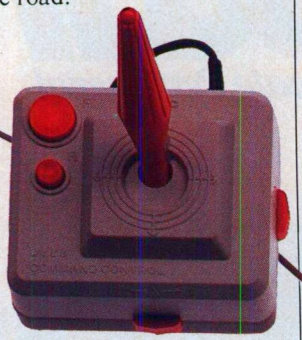

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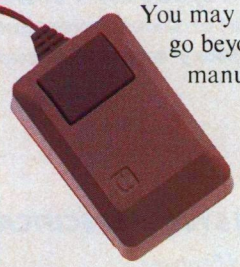

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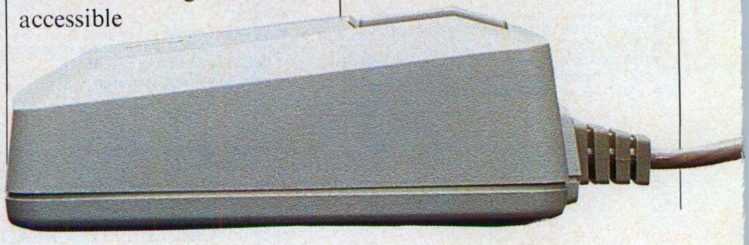

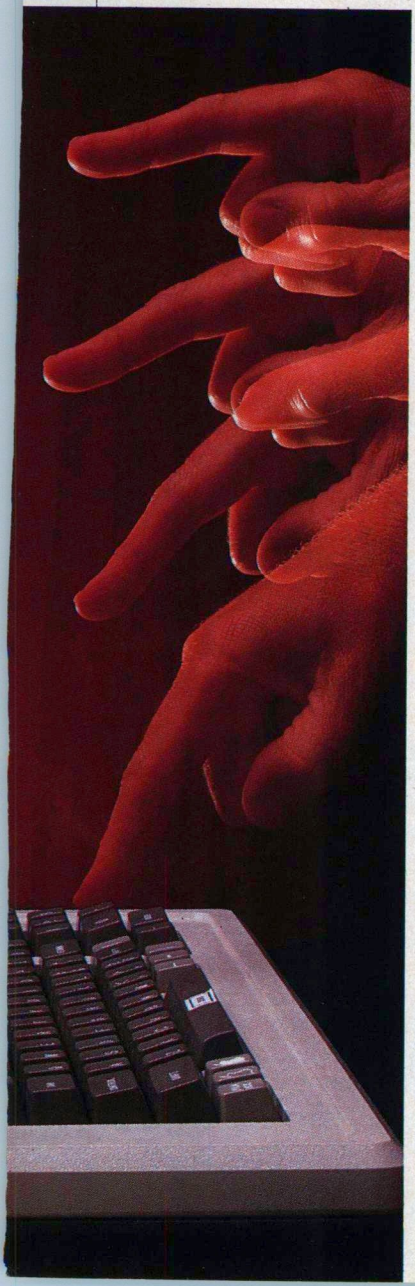

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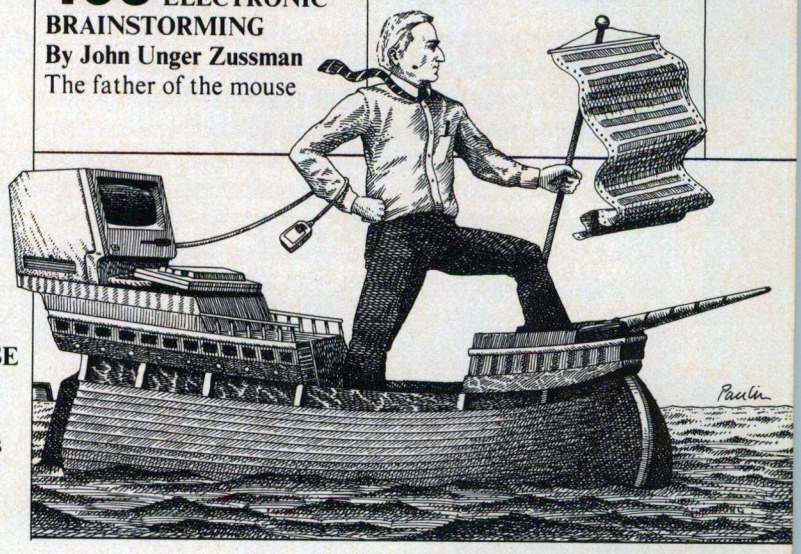

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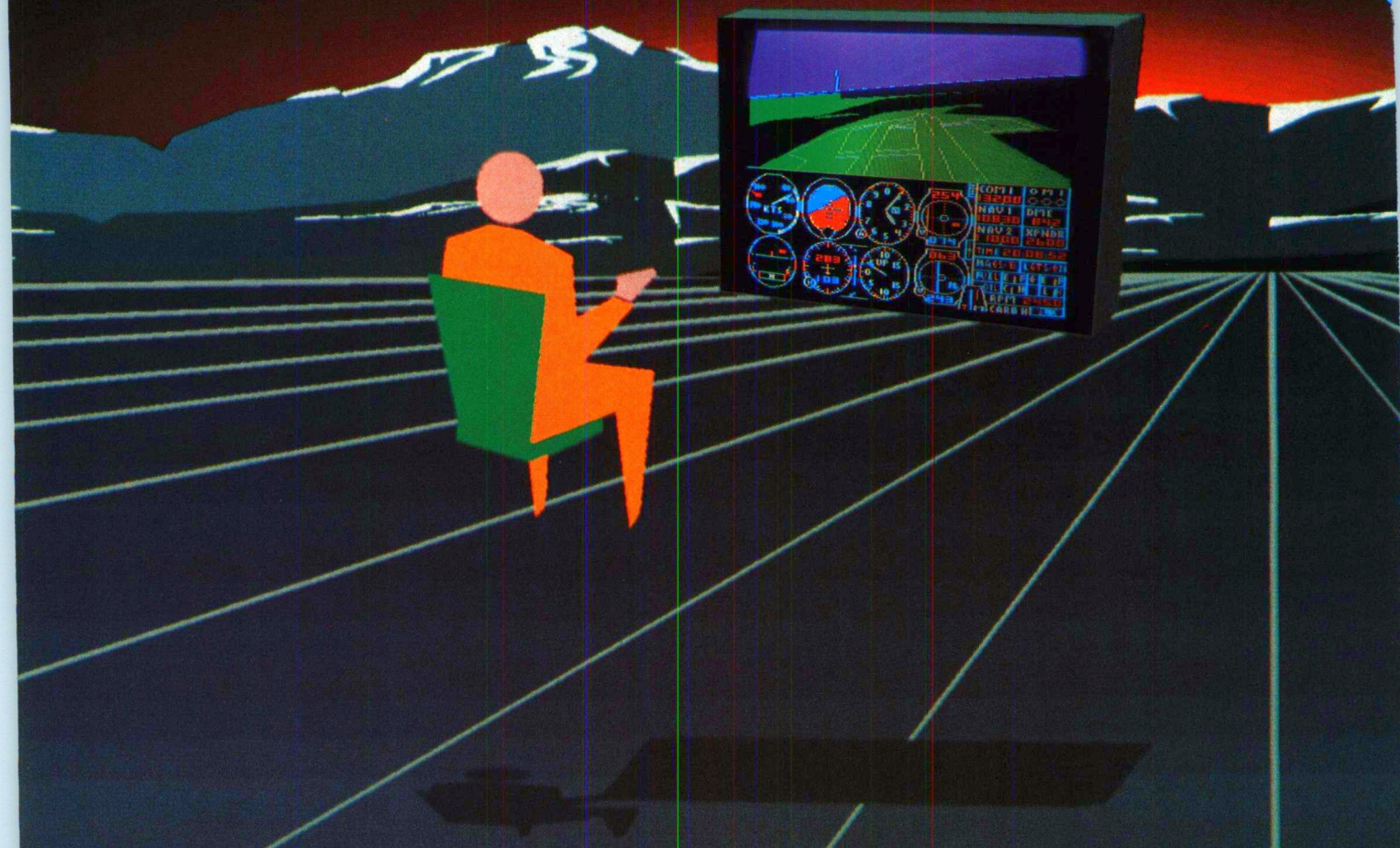

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A+: The Independent Guide for Apple Computing ISSN (#0740-1590) is published for $24.97 one year, $43.97 two years, and $53.97 three years. Additional postage $12 for Canada, $12 other foreign by Ziff-Davis Publishing Co., One Park Ave., New York, NY 10016. Second-Class pending at New York, NY 10016 and at additional mailing offices. POSTMASTER: Send address changes to A+, P.O. Box 2965, Boulder, CO 80321. BPA membership (SMA Division) applied for October 1983.

Editorial Office: 11 Davis Drive, Belmont, CA 94002; Business Office: One Park Avenue, New York, NY 10016. Editorial (415) 594-2290, Advertising (212) 725-7947. For subscription inquiries and service, write to A+, P.O. Box 2965, Boulder, CO 80321.

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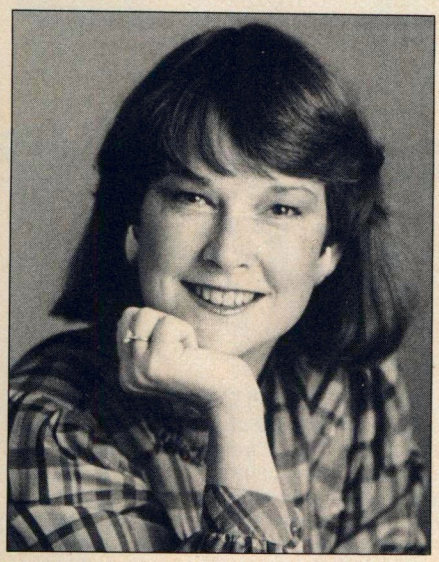


Habits die hard, they say, and I have to concur when it comes to keyboards. As one who learned to type relatively late (at the age of 23), I made the jump to computer keyboards soon after and have been hooked ever since I began making a living as a writer and an editor. Compared to writing on a typewriter, computer word processing is heaven. My love affair with the keyboard is being seriously challenged these days, though, by a new device: the mouse.

Since the introduction of the Macintosh computer, this small mechanical creature has captured a lot of attention. Although the mouse has been around for quite a while—nearly two decades (see "A Modern Mouse Story," page 32, and "The Father Of The Mouse," page 105)—Apple Computer is the company that has brought the mouse into the limelight. The company is basing much of its selling pitch on the idea that the mouse, along with other features of Lisa and Macintosh technology, makes it easier to use computers. The idea is that a mouse-controlled cursor makes the computer less intimidating to the nontypists of the world.

The jury is still out on the merits of the mouse. From a practical point of view, the beast is impractical for the input of text, so it is not going to replace the trusty keyboard.

Rationally, I can see many mouse advantages. For example, a mouse is especially useful when you have to place, select, and move items on the screen, such as in graphics entry. One of the best examples is CAD, computer-aided design. In order to draw a floor plan on a computer, for example, you need the freedom to move in any direction, including diagonally—a freedom which a mouse device can give you. Accomplishing the same objective using only a keyboard would be almost prohibitively cumbersome.

Manipulating on-screen windows is another case in which a mouse is not only useful but even critical. Windows enable you to do many things, from selecting menus to performing several tasks simultaneously, depending on the software. The mouse makes working with windows easy, convenient, and speedy, because all you have to do is point, rather than mess around with the keyboard to position the cursor in the right place. Even though I am used to my keyboard, I have to admit that using the mouse is a lot faster and easier than typing commands on a keyboard.

The mouse is also an excellent tool for graphics-oriented computer users. Obviously, good software is a prerequisite for creative expression on any computer. MacPaint is a superb example of graphics software that uses the mouse imaginatively. I have yet to meet an artist who has tried MacPaint, and is not entranced with the quality of the artistic creations this program makes possible on the Macintosh. The mouse comes into play when you point and pull together graphic elements. Since creating graphics does not require much data entry, keyboard habits don't interfere with the effective use of the mouse technology.

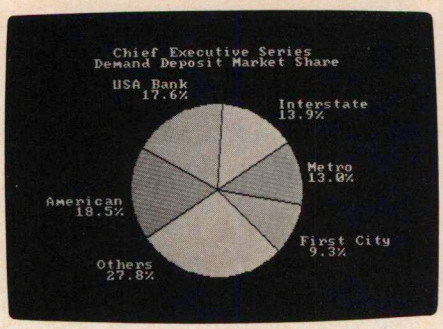
Habits. They're still my problem. I remain keyboard-bound and find myself constantly trying to move the cursor around via the keyboard on the Mac. I am used to my ancient keyboard rituals, and it is tough to give them up. For me, learning to use a mouse effectively takes time, and the more I use it, the more I feel that certain applications do not benefit from the use of a mouse.

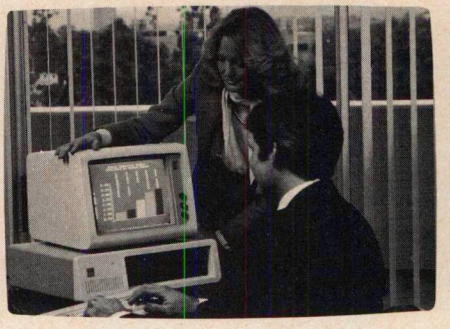
The mouse is not effective—I hope unsuspecting novice users are not misled to think otherwise—in the entering of raw text or numbers in documents, spreadsheets, or databases. You still have to type in letters—the mouse can't type, but it is effective for editing. Some of us old aardvarks who are used to moving the cursor around from the keyboard find using the mouse awkward and annoying when we're trying to pound out five fast pages of text. The solution to this dilemma is obvious—give users a choice between mouse and keyboard by including cursor-control keys on the keyboard. Then we can use a mouse to point, move, and select after we've finished entering data.

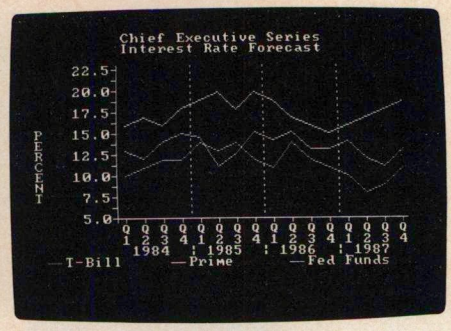
Although the mouse has been around for quite a while—nearly two decades—Apple Computer is the company that has brought the mouse into the limelight.

My conclusion after several months of using the mouse is that it has its legitimate uses and is not a gimmick, but it will take some time for veteran computer users to break their old habits and adjust to the changing times and technologies. +

Maggie Canon







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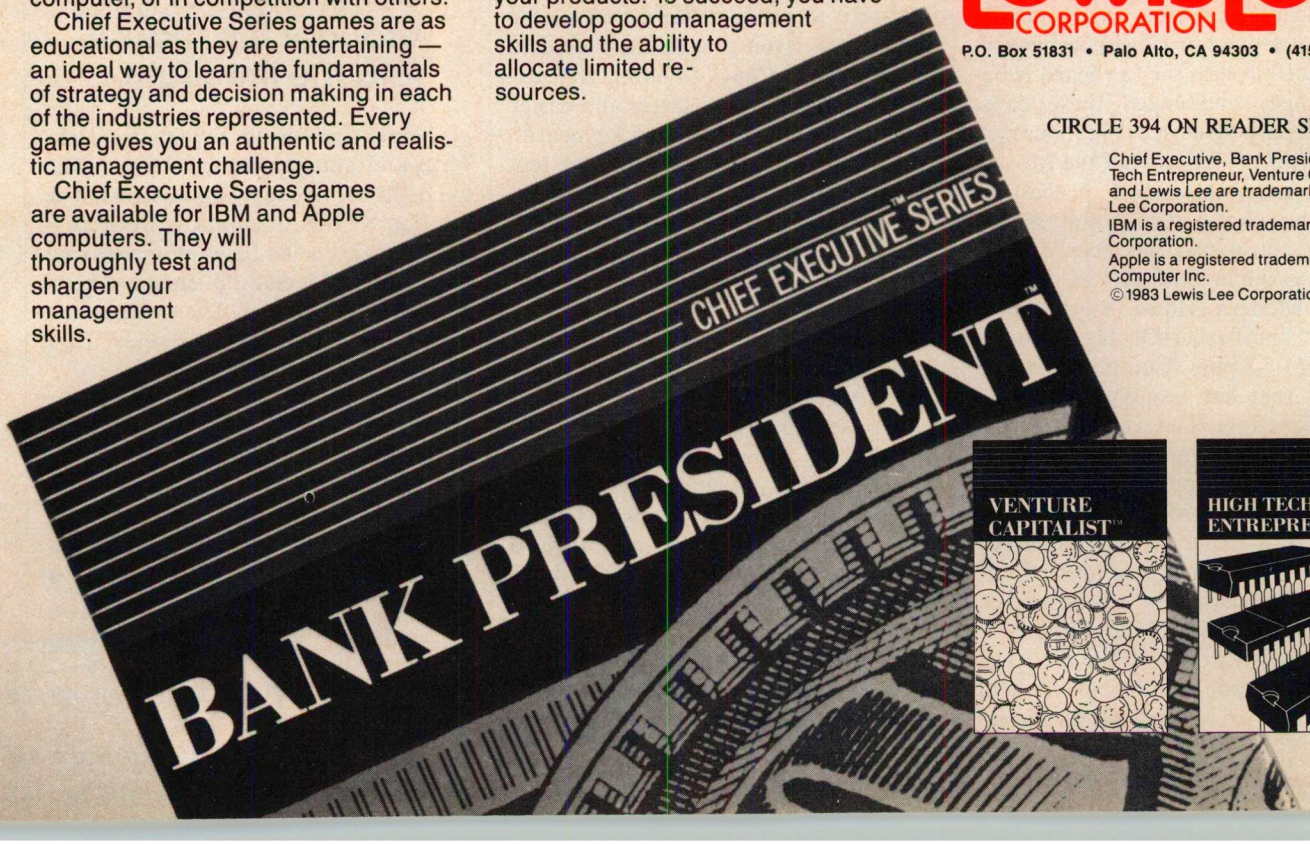


LETTERS TO THE EDITOR

TRADING PLACES

Dear *A+*,

I enjoyed reading the article by John Zussman, entitled "Trading Places," in the March issue. Perhaps certain technological developments should be viewed as "extensions of self." For example, the auto I jump into several times a day has made me more mobile than any of my ancestors. Communications satellites provide real-time awareness of events occurring anywhere in the world.

The personal computer can be viewed as a device that has the potential to help us recover some of the independence and to regain the ability to feel satisfaction in the products of our livelihood that individuals lost with the advent of the industrial revolution. This device, even in its present form, opens up vast information resources to the initiated.

The storage of facts and data are now the domain of machines. The talents and creativity that are elements of everyone's humanness can now manifest themselves. Released from the bonds of factual retention, the human mind can concern itself with seeking solutions to problems through exercising creativity and allowing a greater use of intuitive abilities. The result may be a more self-fulfilled individual and, hopefully, a more adaptive, heterogeneous, tolerant society.

Paul DiBara
Barre, MA

THE VERSAWRITER TABLET

Dear *A+*,

I was very interested in your magazine's review of graphics tablets for the Apple II in the February 1984 issue.

The review has a major deficiency, however—the omission of the VersaWriter graphics tablet produced by Versa Computing, Inc. This is an extremely powerful package that is in many ways more capable than the Apple Graphics Tablet, yet costs less than half the price at $295 (and substantially less by mail order). It is very similar to a conventional drafting table, except that the hinge points of the arms incorporate potentiometers that sense relative position. This arrangement allows the VersaWriter to be connected to the normal game input port used by paddles and joystick without any special hardware, a positive design feature.

The software is unprotected and can be backed up. It includes the normal line-draw routines, screen reverse, color fill, text mode, shape-table creation and editing (vector or color), a microscope editing mode, area and perimeter calculation, drawing-size scaling, recentering, and drawing-move routines. It doesn't do squares automatically, but that deficiency is not fatal. The shapes are stored as normal Apple shapes, making it very easy to use them in BASIC programs.

Perhaps certain technological developments should be viewed as 'extensions of self.'

The only major drawbacks of the VersaWriter are the age of the product (more than three years) and the somewhat incomplete and uneven documentation. The age is a particularly unfortunate factor, since the program does not react to the user in nearly as elegant a fashion as current graphics software. It is in need of a significant revision. The color-fill routine in particular can be tedious to apply to complex shapes (especially when compared to the smoothness and completeness of the KoalaPad's MicroIllustrator).

And worst of all, Versa's advertising is well below the industry standard, with the result that this excellent product remains relatively unknown. This is indeed unfortunate, since the VersaWriter provides a very powerful tool for performing some serious graphics work for a price that's much more affordable than the upper-end products reviewed in your article. It is a quality product in the medium price range that provides an important alternative to the serious, but not too well-heeled, computer-graphics designer.

Hank Caruso
Glen Burnie, MD

THE LISA ALARM

Dear *A+*,

The salesman at Atlantic Business Computers in Winter Park, Florida, thought you would be interested in this true story.

Although a burglar saw the external red lights on our alarm system at our Connecticut home, he quite rightly assumed we were too lazy to put on the internal system. He simply took an ax and sledgehammer, which were conveniently stored in the garage, and cut a hole in the side of the house. He ransacked the bedrooms and stole jewelry worth several thousand dollars, but he did *not* enter my office nor that of my wife, which is located just beyond mine.

The burglar apparently saw the flashing red light on the Lisa's ProFile, which Apple recommends be left on when the Lisa is used frequently. I guess he thought it was an internal alarm system and dared not venture in. Not a thing in either office was touched, thanks to the Lisa.

H.T. Winton
Winter Park, FL

MACINTOSH MULTIPLAN

Dear *A+*,

We have discovered a problem in version 1.00 of our Macintosh Multiplan software. Microsoft has released a new version (1.01) that corrects the problem and is planning a free update for all purchasers. In addition, distributors and retailers have been encouraged

to return their product to Microsoft for exchange at no charge.

The problem in the original version which was shipped on the day of the Macintosh introduction relates directly to saving a spreadsheet.

All registered owners will automatically receive the free update—no request is required—which will be shipped by mid-April. If you own Macintosh Multiplan and have not returned your registration cards, you should do so immediately. If you've misplaced the card, you can send a sales receipt as proof of purchase to:

Microsoft Corporation
Customer Service
10700 Northup Way, Box 97200
Bellevue, WA 98009

Here is a summary of the problems in the program:

1. If you save a worksheet in any way other than using the Save command, you may lose data when you open the worksheet later. You can encounter this problem if you save files as a response to the Quit, New, or Open commands.
2. Saving a worksheet when expressions created by a Fill-Right or Fill-Down command are resident in the clipboard can also cause problems with worksheet data.
3. Attempting to bring up any of the Macintosh's desk ornaments (such as the calculator, alarm clock, or puzzle) while printing a worksheet can cause a system crash due to memory shortage.

Follow these suggestions to avoid these problems:

1. Always use the Save command to save a file before using Quit, New, or Open.
2. Always make sure the clipboard is empty before executing a Save command. The easiest way to empty the contents of the clipboard is to select an insertion point and then cut.
3. Do not attempt to bring up any Macintosh desk ornaments while printing.
4. Once a file has been corrupted (e.g., serious system error or strange characters appearing within the cells), dispose of the file by putting it in the trash can.

Marty Taucher
Senior Public Relations Manager
Microsoft Corporation
Bellevue, WA

CORRECTIONS

In our May 1984 issue, on page 102, we incorrectly listed the price of MacForth from Creative Solutions as $24.95. The correct price is $149.

Synetix, Inc., which we mentioned on page 46 of the same issue, has a new address: 10635 N.E. 38th place, Kirkland, WA 98033; their telephone number is (206) 828-4884.

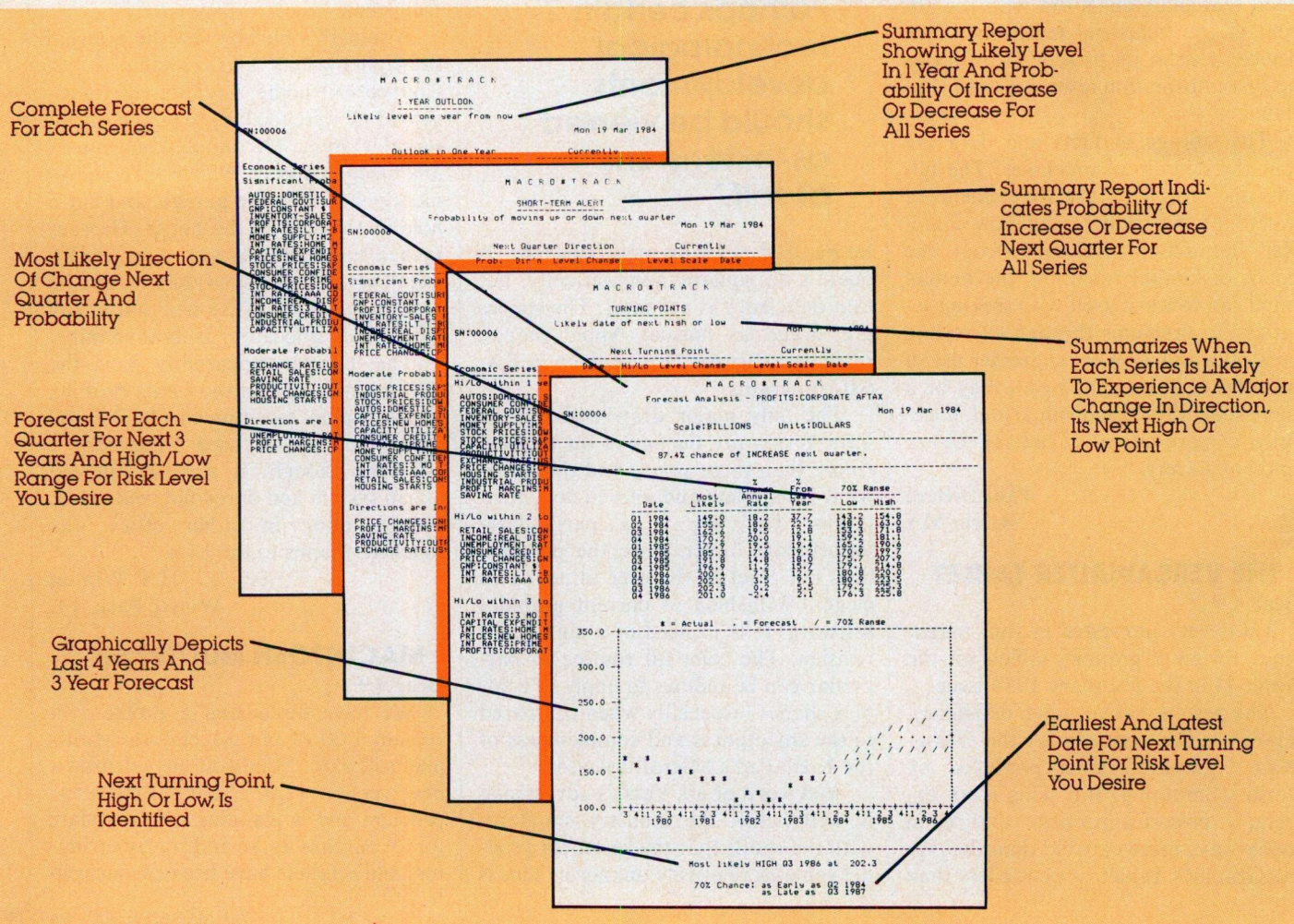
In the article "Accelerating Your Apple," on page 49 of our May issue, the author mentions only one accelerator board, SpeeDemon from McT. His coverage of the product was based on information about a preproduction model, but the SpeeDemon was not actually available at the time. Several manufacturers do have accelerator boards available, including Titan Technologies, Legend Industries, and Omega Software.

CLARIFICATION

Reader Ken Kashmarek of Eldridge, Iowa, offers extensive comments on our March 1984 issue. His observations are valuable, so we are printing them here, edited only slightly for length.

I have just finished reading the March 1984 issue of *A+*. I am impressed with the contents of this issue. Almost every article discussed something that I wanted to read about.

You couldn't have done a better job on the 68000 boards. The article had



good balance, with something for everyone. The entire coprocessor section was terrific. *A+* put out the first review that I have found on the CP/M Card. If I go to CP/M, this is the board. However, I believe you left out the fact that the CP/M Card also comes with GSX-80. Anyway, I hope they have not dropped this as a part of the package. If anything was left out of the coprocessor section, it would have been a discussion of special-purpose processor boards or chips. For example, the 7811 numeric processor (used by Micro-Speed, I believe) and the Mill 6809 card.

The articles on Dollars and Sense, Savvy, and ThinkTank were a real bonus in the issue. I had been eagerly awaiting a review of Dollars and Sense before buying it. I like the relational-database part of Savvy. The distributors are not doing a good job of presenting their product in their advertising, however. The only indication of the need for a Z80 card is the picture of the board in the advertisement. They have limited their marketplace. Current CP/M users won't buy the product, since they already have a Z80 board. Potential new CP/M users won't buy the product if it does not have the Z80 board they are interested in (since it doesn't provide CP/M either, that is another negative). If they pick a board as a standard part of the product, it should be the CP/M Card.

I did find several problems in the article "Manage Those Files" which appeared on page 88 of the March issue. The author made a few errors in the AUTO CAT BOOT program he listed.

The article seems to be intended for beginning programmers, or at least people who have not spent a great deal of time working with Applesoft, DOS, and disk files. I entered the program because I saw many errors that should not be present in a published article.

First, your typesetter took great delight in replacing the double quote (") in the program listing with single quotes (' '). Obviously, single quotes will not work with Applesoft. I attribute this to your typesetter, since the program could not have run with the single quotes. Some typesetting systems are not equipped with a double quote. *(Note: Our typesetters have since created a double quote to resolve this problem.)*

Second, always, but always, print Applesoft program listings exactly as they appear as output from the LIST command in 40-column mode. Do not allow the typesetter to use proportional spacing when setting program listings. If the listing appears exactly as in the 40-column output from LIST, then a reader can quickly perform an eyeball comparison of the program as he has entered it on his computer. This strategy avoids a lot of confusion over what is printed in the article and what the reader should enter at his keyboard. This is especially true for character literals that span a single line. Also, do not include trick REM statements that contain embedded carriage-return characters.

The output on page 93 should have been presented exactly as it appears on the 40-column Apple screen. Then there is no confusion about what users see on their computer when they run the program the first time. These comments so far cover suggestions on how to present Applesoft programs and output in a published article. Now, I will address the program itself.

This program tells me a couple of things about the author. He is a former Integer BASIC programmer (Control-D between quotes in line 60), or a beginning Applesoft programmer. His lack of familiarity with Applesoft is obvious in his use of GET (line 180) and

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IN#6 (line 330).

GET is a strange creature. GET followed by PRINT D$ always results in the command being displayed on the screen (or printer if it is on). The output from line 330 was displayed on my screen. Why? Use of D$ (Control-D) to send a command to DOS must be preceded by the output of a carriage return, which sets the cursor to the beginning of a line on the screen and the proper output character intercept state in DOS so the command will be recognized. After line 330 is complete, the proper intercept state is established. A simple PRINT command in line 330 would have accomplished the same purpose. If a DOS command is to be issued after GET, then the GET command must be followed by PRINT.

The glaring error in line 330 is the fact that IN#6 will boot a disk! Had this command gotten through to DOS, the disk would have booted! I can envision the sequence that the author went through when developing this program. He could not get line 340 to work (since a PRINT was not used after GET). He inserted line 330, and the program worked (apparently the author thought that IN#6 would allow input from the disk). This reflects his lack of experience with Applesoft and DOS. Note that the sequence of commands GET A$: HOME: PRINT D$; . . . achieves the same result as GET A$: PRINT: PRINT D$; . . . since HOME also sets the cursor to the beginning of a line (therefore, DOS is able to properly intercept the command following Control-D). Thus, the problem did not occur with the other commands because the DOS command was preceded by HOME or a PRINT command that left the cursor at the beginning of a line.

In line 260, PR#6 is a proper Applesoft command. It changes the output hooks so that the next output will go to slot 6. Normally, PR#6 from the keyboard will immediately boot the disk in slot 6, drive 1. In this case, line 270 gets executed next. Line 270 transfers control to line 10, which issues the HOME command. The next output is in line 40 and is directed to slot 6. The controller in slot 6 then responds by booting the disk in drive 1. I am sure the author was not aware that the PRINT command in line 40 was booting his disk as a result of the PR#6 in line 260. A better technique is to follow PR#6 by :END. When END is executed, Applesoft will attempt to display a cursor. This will then initiate the boot process. The correct technique is to use PRINT D$;"PR#6": END so DOS remains hooked. Granted, the end result is the same: a new disk is booted. The lesson passed on to a beginning programmer is much different, though.

The important thing is to present an understanding of how the program works and why. Under DOS 3.3, PR#6 is bad programming practice. If an error occurs, DOS might be unhooked. Control-D PR#6 is the preferred technique, not so much from the standpoint of using PR#6 to boot a disk, but from the standpoint of using the Applesoft PR# command for turning a printer on and off. For consistency, all DOS commands should be executed via Control-D (IN# and PR# are DOS commands if DOS is active). This was correctly done in lines 340 and 350.

It is easy to make a keying error when entering programs from magazine listings.

ONERR in line 20 is a potential trap. It is easy to make a keying error when entering programs from magazine listings. I made several on this one. As such, SYNTAX ERROR would have been generated if not for line 20, which took me to line 380, which indicated a disk I/O ERROR (and the disk drive did not even come on!). Thus, my keying error was hidden until I deleted line 20. For this program, ONERR should not have been used. The technique is too advanced for beginners. If it is to be used, it should be turned on and off (POKE 216,0) before and after the DOS commands. Otherwise, a more complete error-handling routine is necessary in line 380.

Option 2 displays the catalog twice, since line 360 goes back to line 10. Since line 310 goes to line 100, I suspect that line 360 should also be GOTO 100.

There is a problem with the use of INVERSE and NORMAL. Line 160 sets INVERSE. If option 2 (or carriage return) is chosen, then the subsequent execution of HOME clears the screen to inverse characters. NORMAL should be used at the end of line 160 to bypass this problem.

Finally, the last paragraph of the article really exhibits the author's lack of knowledge about Applesoft and DOS. He states that the program is very large and takes 70 of the 560 sectors on a diskette. The catalog display earlier on the same page shows only 5 sectors, however. Where did he get the 70-sector value? After all, the program is only 43 lines long, and the maximum line length is 239 characters, which is far less than 70 sectors. The actual program takes less than 1% of the disk.

Here is a corrected version of the program that I have modified for the benefit of *A+*'s readers:

```
]LIST

10  HOME
20  ONERR  GOTO 380
30  INVERSE
40  PRINT "TLM DATAMATICS AUTO/CA
    T/BOOT"
45  HTAB 7: PRINT "COPYRIGHT.C.19
    83"
50  NORMAL
60 D$ =  CHR$ (4)
70  VTAB 4: INVERSE : PRINT "C A
    T A L O G DRIVE-1": NORMAL
75  PRINT "..................
    ....."
80  PRINT D$;"CATALOG,D1"
100  PRINT : PRINT "..........
    ..........."
110  PRINT "*  B  BOOTS ANOTHER D
    ISKETTE"
120  PRINT "*  1  SHOWS DRIVE-1 C
    ATALOG AGAIN"
130  PRINT "*  2  SHOWS DRIVE-2 C
    ATALOG"
140  PRINT "*  3  PAPER COPY OF C
    ATALOG"
150  PRINT "* ..... TO PROGRAM,
    PRES -RTN-"
160  PRINT : INVERSE : PRINT "PLE
    ASE SELECT: ";: NORMAL
180  GET MENU$: PRINT : HOME
190  IF MENU$ = "B" THEN  PRINT D
    $"PR#6": END
200  IF MENU$ = "1" THEN 10
210  IF MENU$ = "2" THEN 290
220  IF MENU$ = "3" THEN 330
230  IF MENU$ =  CHR$ (13) THEN 4
    10
240  GOTO 180
290  VTAB 4: INVERSE : PRINT "C A
     T A L O G DRIVE-2": NORMAL

300  PRINT D$;"CATALOG,D2"
310  GOTO 100
330  PRINT D$;"PR#1": PRINT D$;"C
    ATALOG"
350  PRINT D$;"PR#0"
360  GOTO 100
380  IF  PEEK (222) <  > 8 THEN 4
    20
385  INVERSE : VTAB 5: HTAB 14
390  PRINT "I/O ERROR": NORMAL
395  PRINT : PRINT : HTAB 13: PRINT
    "CHECK DRIVE"
400  FOR PAUSE = 1 TO 2800: NEXT
    : HOME : GOTO 10
410  INVERSE : PRINT "APPLESOFT B
    ASIC. GO FOR IT!": NORMAL : NEW

420  PRINT  CHR$ (7)"ERROR ENCOUN
    TERED IN LINE "; PEEK (218) +
     PEEK (219) * 256: PRINT : PRINT
    "ERROR CODE = "; PEEK (222)
800  PRINT D$;"CATALOG,D2"

]
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That's the idea behind a new set of small-business software called the I Discover System, which personalizes a series of preprogrammed and illustrated children's stories with such data as a youngster's name, birthdate, school, age, and favorite pet. The result: a hardbound book tailored to a single child.

The package requires an Apple II with printer, disk drive, and monitor. Aimed at small-scale entrepreneurs, I Discover's software prints not only the books, but also the mailing lists to help with marketing later. Creative Concepts Corporation of Andover, Massachusetts, says the book-printing process takes only five minutes, "and the customer can watch every exciting step" of the printing. That all sounds fine—now how about a personalized mystery novel for us adults?

THE SCAN WHAT AM

There's a science-fiction story in which all of the knowledge of the universe has been stored in the equivalent of a single library-card-catalog drawer—every other drawer in that unimaginably gigantic library is devoted to indexes, and indexes of indexes, of the original information.

We'll probably get to that stage in a million years or so. Meanwhile, while we're still on the single-index level, an enterprising floppy-disk manufacturer has come up with a guide to our current information onslaught: *Infoscan*, a personal-computer version of the *Reader's Guide to Periodical Literature*.

The monthly 15-page pamphlet indexes more than 400 articles from current personal-computer magazines.

Syncom, a small company in South Dakota, publishes it as a marketing gimmick. Coincidentally, the ads in *Infoscan* are all for Syncom products.

The best marketing gimmicks, however, really serve their target market. To find out whether *Infoscan* will cut your search time, call (800) 843-9862 toll-free for a free subscription.

IBM'S 'DOGS' POUNDED

The quote of the month comes from what may be the microcomputer industry's first chain letter. Circulated by someone calling himself "The Shadow," the letter calls for the formation of an organization dedicated to stopping the onslaught of that *other* computer giant, IBM.

No half-measures for the Shadow. He urges members of the fledgling Anti-IBM Underground Guerrilla Organization, or AIBMUGO (pronounced IBM-you-go), to "Contaminate their data base. Violate their protocol. Decode their EBCDIC. Punch their cards. Fold, spindle, and mutilate."

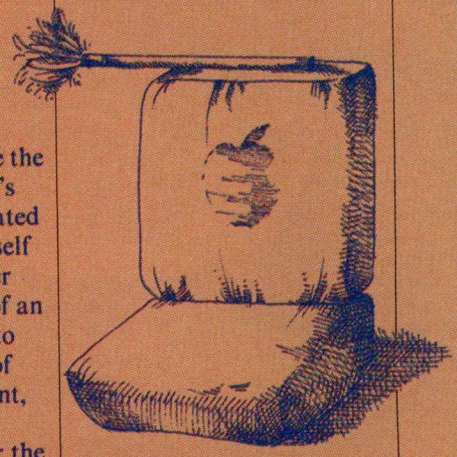
Most relevant to Apple aficionados is The Shadow's predilection for the 68000 chip.

Says the Shadow: "IBM knows that networked, 68000 microcomputers will eventually cut into IBM's market for obsolete mainframes, not to mention their minis and Displaywriters.

"If the PCjr is a rifle aimed at Apple's IIe cash cow, networked 68000's are cannons aimed at IBM's mainframe dogs."

Those who wish to receive more information about AIBMUGO should write to the organization at 19 Fourth Court, Hermosa Beach, CA 90254.

Those who want to perpetuate the chain letter are requested to send it to ten fellow computer fans and to post it on electronic bulletin boards.



WHAT THE WELL-DRESSED APPLE WILL WEAR

Fashion designer Babette Pinsky has made covering things her business. She started out by designing shower caps and dresses and then branched into fancy typewriter covers about eight years ago. Her latest glamour line centers on wraps for another high-fashion item, the personal computer.

Babette, Pinsky's company in Sausalito, California, offers covers for most Apple computers and their peripherals, including small and large printers and single or double disk drives. The designer says the idea struck her shortly after her computer was sidelined because of a dust-related problem. "Nearly 90% of all computer problems that require repair are related to dust," she says.

The results of her quest for a cover both stylish and dust-repellent were a set of computer garments in Scotchgarded dark-brown cotton suede cloth with beige piping or, if you prefer, beige with dark-brown piping. At this writing, Pinsky expects Babette's next product will be keeping the Macintosh dapper and dustfree.

HOW TO TRAVEL WITH YOUR COMPUTER

You'll have to plan ahead if you've scheduled a working vacation overseas with your computer.

The U.S. Customs Service will be scrutinizing the travel plans of high-technology equipment with great care this year. On the Atlantic side, agents will be randomly checking passengers and their luggage, in an attempt to stop smuggling to the Soviet bloc, and at Pacific entry points, customs agents are alert to the possibility of bogus computers and components entering America. If you can't prove the computer was yours *before* you left the country, you may have to pay import duty—or your machine may be confiscated.

How can you avoid hassles in customs? The easiest way is to pack a sales receipt with serial numbers, according to Steve Waterson, import specialist with the U.S. Customs Service. "If you take a computer out of the country, it's good to register it in advance, especially if it's foreign-made," says Waterson.

As long as the computer is "bona fide personal effects," that should hold you. If you're carrying more than one computer, or assorted peripherals, though, you may have to contact the customs office or the U.S. Department of Commerce for a shipper's export declaration. This, Waterson admits, gets sticky. Avoid it if possible.

If you must purchase a computer overseas, stay away from big names such as IBM and Apple. Chances are good that thanks to the wonders of computer piracy, especially in Asia, you might not get the genuine article. You might have to wave goodbye to your marvelous buy when you reach the customs line and the agents reveal its counterfeit chips.

Basically, "use common-sense-guidelines," advises Waterson. Take your receipts with you—it needn't be the original, he adds—travel light, and don't bring back any wooden Apples.

FARM-OUT SOFTWARE

The state of California, as a prime mover in both agriculture and electronics, has come to the aid of its high-tech farmers and issued a *Computers in Agriculture Software Directory*.

The directory indexes 71 companies' offerings by software and service type, and by operating system and hardware. Software abounds in areas that range from marketing to crops to livestock to weather. Looking for software to help you tag tomato grades, analyze wheat futures, or track cotton bales? It's all here.

The directory lists addresses for all companies indexed.

Though the directory comes from California, the software it lists is available nationally and internationally. For copies of the directory, write Assembly Member Sam Farr, Chairman, Economic Development and New Technologies Committee, State Capitol, Room 3120, Sacramento, CA 95814.

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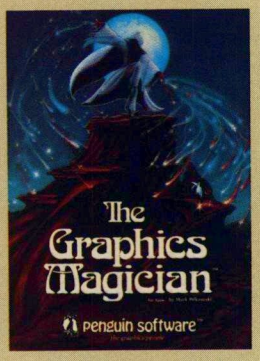
The Complete Graphics System

This brand-new version of our non-programmers' graphics tools includes both best-selling and highly rated products: The Complete Graphics System II and Special Effects, combined into one easy-to-use package. All the command structures have been updated so that selections are made directly by pointing at choices from a graphics screen, or options are described on convenient help screens. This version is so advanced that users will hardly need a manual at all, yet they'll have the most diverse and powerful set of graphic capabilities readily at their fingertips. And we've combined all different versions into one single package that works with joysticks, paddles, trackball, the Apple Graphics Tablet, Apple Mouse, Houston Instruments' HiPad, and the Koala Pad. Priced at $79.95, it's sure to remain the most-used graphics development tool for the Apple.

The Graphics Magician



The new version of The Graphics Magician takes all the abilities of the original version, adds to them, and simplifies their use for even the least technically-oriented programmers. Animation and picture-drawing routines from this best-seller are being used in published products from over two dozen companies, including the likes of Sierra On-Line, Sir-Tech, Milton-Bradley, Mattel, Spinnaker, Adventure International, and many others. The big news is that versions are now being released for Macintosh, Atari, IBM, and Commodore personal computers, with graphics files transferable between computers. That means that a programmer's graphics work on one computer no longer needs to be redone on other computers . . . they can just be transferred with The Graphics Magician. Retail price is $59.95 for the Apple.

Paper Graphics

Paper Graphics is a brand-new graphics screen-to-printer printing utility. As you would expect from Penguin, it's the most advanced and easy-to-use of any such utility available today. An advance, incomplete version has already received an A+ rating from Peelings II, which called it "the most complete of the graphics-dump programs reviewed to date". Besides being compatible with virtually every interface card/black and white printer combination imaginable (we challenge you to find one that it won't work with), Paper Graphics includes magnification, cropping, screen editing, labeling, framing, combination dumps of both graphics screens, and the ability to pack and unpack pictures. At $49.95, you shouldn't settle for less.

Transitions

Transitions is the most advanced graphics presentation system yet on microcomputers. With it, you can easily create self-running or manually operated slide shows or presentations by combining up to eight picture disks (packed or unpacked) and 44 different transitions (screen wipes) between slides. Users can even see a graphic "catalog" of their picture disks, consisting of miniature versions of the pictures on each disk presented on the graphics screen. For a very professional-looking presentation, no other program will do. Transitions retails for $49.95, and together with The Complete Graphics System and Paper Graphics makes the most versatile set of graphics programs anyone could own for their Apple computer.

Additional Typesets and Map Pack

Two add-ons are available for The Complete Graphics System, at $19.95 each. Additional Type Sets contain over 50 extra typefaces that can be used with the text routines in CGS. Map Pack contains over 100 hi-res maps already on packed graphics screens.

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BY STEVE ROSENTHAL
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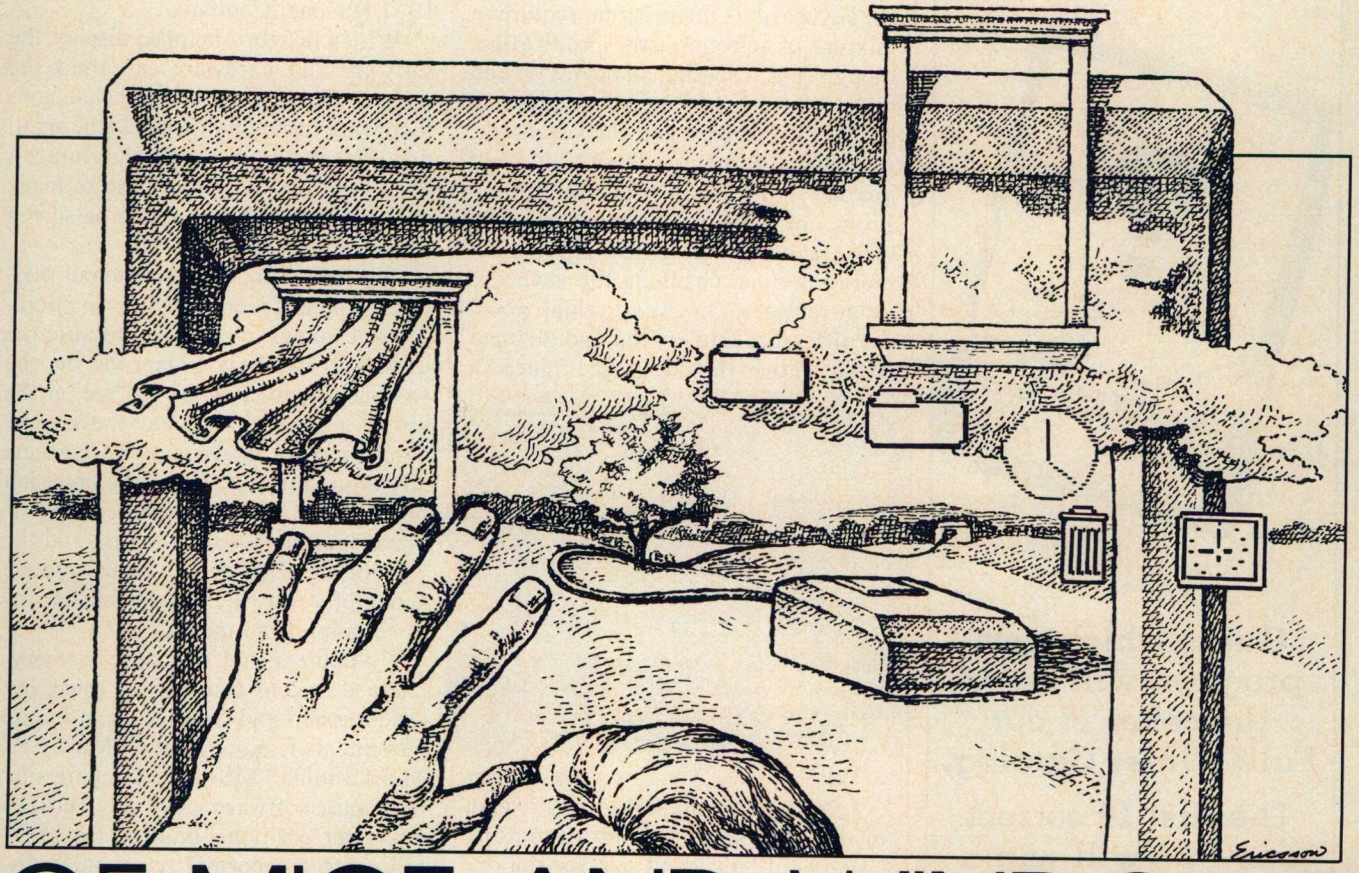


OF MICE AND WINDOWS

Need some help banishing those difficult-to-use-computer blues? Like a headache remedy that promises relief using a combination of ingredients, a lot of new software these days features an amalgam of mice, icons, windows, and integrated functions.

Together, the mouse hardware, the icon-and-window presentation style, and the integrated operating instructions are designed to make it easier and faster to get work done on your computer.

Each of these approaches to making software more accessible may be valuable in its own right, but just as with medicines, various firms combine them in different ways to produce what they hope is a more salable package.

Reach for the Squeak

Of all these innovations, the mouse probably is the most symbolic of the change in outlook. Using this palm-sized device as an adjunct to a keyboard for input changes computer operation from linear, text-oriented, and abstract to geometric, graphic, and concrete.

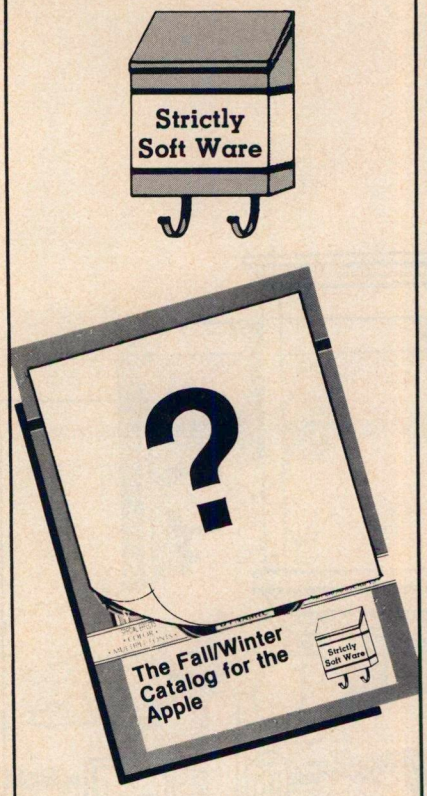
They open up computer use to many people who find dependence on the keyboard an insurmountable psychological barrier.

In the past few years, psychologists have been confirming what artists have been saying for years—the eyes and the body perceive information about shape and movement that can't be precisely translated into words. Until recently, computer use has relied on linear, word-oriented skills. Mice are among the elements that point toward a more balanced approach.

Because mice and a graphic mode of interaction appeal to different parts of the brain than do keyboards and words, they open up computer use to many people who find dependence on the keyboard an insurmountable psychological barrier. The difference is enough to enable some users to perceive a system that uses a mouse as "user-friendly," while they see an otherwise identical system that relies only on the keyboard as remote and unapproachable.

At the operational level, mice are actually specialized cursor controllers. With the right hardware and software, the movements you make with a mouse are reflected directly on the screen.

CELESTE ERICCSON



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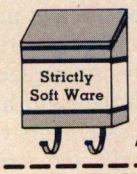

A+

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Any software application that involves cursor keys or positioning commands can potentially use a mouse. Mice are particularly good for selecting from menus, pointing out locations, drawing figures, and for positioning elements of a picture.

When the main activity is choosing among various options, you can use mouse input instead of relying only on the keyboard. If the program requires a mixture of selection and specification, though (e.g., choosing an operation and then specifying a filename), you have to use both the mouse and the keyboard.

Adding a mouse doesn't in itself guarantee a good "user interface." From the software designer's point of view, planning for mouse input takes more than just changing the keyboard input routines. One way to think about the difference is to say that mouse input is wide rather than deep (see figure 1).

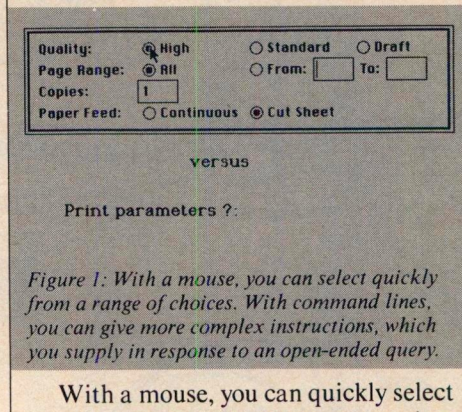

Figure 1: With a mouse, you can select quickly from a range of choices. With command lines, you can give more complex instructions, which you supply in response to an open-ended query.

With a mouse, you can quickly select any character on the screen, any region, any line, and so on. In contrast to using a keyboard, you can't ask for options that weren't displayed, however, and creating complex replies is difficult. Mouse-oriented software, consequently, must take users through smaller steps and branches to provide as many possibilities as the keyboard does, and it must be more thorough in informing users what their choices are at each stage.

Some users find this approach annoying. If you like to combine steps and give instructions in advance, you may have trouble keeping this working style and using a mouse. In fact, a mouse may slow you down—it really depends on which way you think, how quick your fingers are compared with your wrists, and a host of similar individual factors.

If you think best in steps, like to see your options, and are good at eye-hand coordination, you may find your work goes more quickly if you use a mouse. A good deal of research has been done on this question, but none of it is sufficiently clear to predict individual reactions.

A Matter of Hardware

Many types of hardware can, at least in theory, work with a mouse. You get the best results with systems that allow the central processor to write directly to the display screen (memory-mapped display). All of Apple's computers use this method, as does the IBM Personal Computer.

With a memory-mapped display, the software and hardware can treat the mouse movements as directly analogous to moving from pixel to pixel (the small dots that make up the display image). Thus, you can use the mouse to mark objects smaller than a single on-screen character.

In theory, a mouse can send out positioning signals representing even microscopic changes in position. Because the utility of the mouse depends on the feedback between what you see on the screen and the way you move your hand, however, mouse inputs are generally limited in practice to the precision of the video screen. High-density displays, such as those on the Lisa and the Macintosh, allow mouse inputs precise enough for drawing and editing as well as choosing from menus.

Computers that don't use memory-mapped screens can still use mice, but the precision and smoothness of mouse movements is more limited. Most CP/M or "vanilla" MS-DOS computers let the mouse software move only between character positions, limiting the possibilities to the normal rectangular display field, which is 80 characters wide by 24 rows high.

Whether a mouse is a significant advance for interacting with personal computers is a matter of hot dispute at many computer companies, but at Apple, the mouse partisans have won out.

Planning for mouse input takes more than just changing the keyboard input routines.

The Lisa computer was Apple's first mouse-oriented computer, and the Macintosh obviously follows in that line.

The new Apple IIc is also mouse-oriented, although the effort to keep it compatible with existing Apple II-family software kept Apple from making

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the mouse the main input device. And to keep the IIe compatible with new IIc mouse-oriented software, Apple is now selling an optional mouse board and mouse for the older machine.

According to both marketing and engineering people at Apple, the mouse is an essential part of all major new software and hardware projects at the company. Part of the impetus for that commitment is fervent belief in the mouse—and part comes from the realization that the mouse is something that Apple has and IBM does not. If you're interested in the whole story of how Apple became home to so many mice, see "A Modern Mouse Story" on page 32 for the background of that migration.

Most computer companies seem to agree with Apple that the mouse is the best choice for productivity applications.

Of course, the mouse is not the only alternative input device. If you have an Apple II or III, you can also choose among joysticks, graphics tablets, trackballs, light pens, and touch screens. Some of these devices were featured in the February 1984 issue of *A+*, we have a chart about them in this issue (see page 38), and you can expect to see more articles about them in the future.

Most of these keyboard alternatives can theoretically do the same job as the mouse. The exception is the touch screen. Although it is in some ways more convenient than the mouse (you don't need extra room on your desktop, you don't have to look for anything when you've been using the keyboard, and you don't have as many cables to tangle), a touch screen doesn't have the resolution the mouse gives you. Most touch-screen software resolves only a few dozen points across the screen—far fewer than the 80 characters or several hundred pixels you get with the mouse.

Right now, most computer companies seem to agree with Apple that the mouse is the best choice for productivity (nongame) applications. That preference could change when lap-size computers become more prevalent. Mice need a smooth flat surface, and besides, most people would rather not have a mouse running around in their lap.

Icon, You Can

In popular imagination, biological mice are paired with cheese. In the personal-computer world, electronic mice are often paired with icons.

An icon is a stylized picture that serves as a symbol. Instead of using a word or phrase to represent a concept or object, a computer can use an icon as a graphic equivalent. Most are pictorial, but they can also be abstract, evocative (intended to create certain associations or connections in the viewers' mind), or schematic (representing the way something works, rather than what it looks like).

Icons, say their proponents, are "friendlier," easy to distinguish quickly, and a welcome change from the usual endless text on the screen. Because icons are graphic, you react to them differently than you do to linear, word-oriented labels.

Icons appeal to the artistic side of the brain. You can react to them without translating them into words.

In practice, icons in any but the simplest of programs are supplemented with text labels or explanations. That's because most people in our culture, unfortunately, can distinguish only icons that are markedly different. To communicate all of the various options and parameters in a program of any complexity, software authors still need to resort to text. In other areas of the world that use pictographic alphabets, a totally iconic approach might be more successful than it is here.

The lack of subtlety in our visual vocabulary has another unfortunate effect. Because most icons show only gross differences, using icons implies a level of simplicity that users may unconsciously read as lack of sophistication. An iconic presentation that even a young child can understand may come across to experienced viewers as simplistic and boring.

The challenge, then, for using icons in software is to make them understandable to new users but informative enough for the more experienced.

Apple's approach to icons has been a balanced one. Although icons represent files and disks on the Macintosh and Lisa, each icon also has a label underneath. If you want a detailed view of the directory, you can switch the directory listing from icons to text listings.

Apple's mouse-oriented graphics programs (MacDraw, LisaDraw, MousePaint) also use icons for many of the options, but even in them the pull-

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down menus for more complex operations show you a series of phrases, rather than a series of pictures.

In more text-oriented programs (such as MacWrite or LisaWrite), icons take a backseat to words but are definitely part of the package. In MacWrite, for example, you place a date in the page header by dragging a calendar icon to the position in the header where you want the date to appear. In AppleWorks, the files appear in a series of outlines that represent file folders.

Icons also play a key role in scrolling on the Lisa and Macintosh. You tell most software for these machines to display a different portion of your text by moving a scroll bar or elevator—both schematic symbols for the scrolling process.

Windows

If you don't associate icons with electronic mice, chances are you think of windows instead. Dividing the screen into different boxes doesn't necessarily have much to do with electronic rodents, but these two approaches have more than a random connection.

Both of them emphasize the position of information; for best results, both need fast, detailed graphics screens; and both widen the channel of information between user and machine.

Not every display with a box shape on it has windows. In theory, each box on a windowed screen is independent, and each one involves a separate program or activity. Windows are often associated with multitasking software (which allows you to work on several jobs or steps in the same computing session), especially multitasking software for single users.

Even new programs such as AppleWorks for the II family let you open one task on top of another.

Software that is not multitasking may still have windows, but because the processor handles only one task at a time, only one window on each display can be active at any time—the other parts of the display are frozen. If the software can update each window fast enough, in turn, the result may be apparent activity in all windows.

Along with offering many advantages for presenting complex information, windows simplify the writing of mouse software. With windowing, software designers do not have to limit the display of the program to one end of the screen and the menus and icons for the mouse to another. Instead, they can write software to open windows in front of other tasks when they need to show a complex menu and can hide the menu when they don't want it anymore.

Pop-up and pull-down menus are another form of windows. Instead of taking a central spot on the screen, these lists of choices usually occupy an area extending from the screen's edge in toward the center. Because it takes up screen space only when it's in use, this type of menu lets the software offer you a wide range of choices without taking up valuable space from the main display.

Since Apple started marketing the Lisa, almost all company-produced software has relied extensively on windows. Along with icons, windows are the most visible manifestation of the direction Apple has been taking in software design. The Macintosh makes extensive use of windows, and even new programs such as AppleWorks for the II family let you open one task on top of another.

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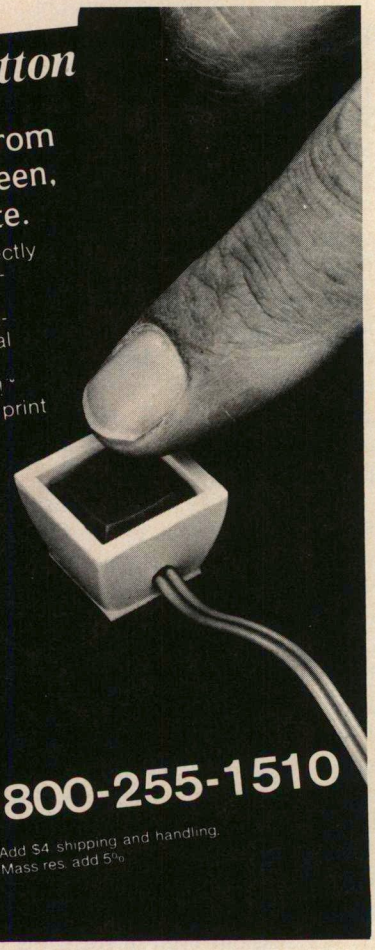

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United We Stand

Another system approach that many people associate with mice and windows is integrated software. Integration is the attempt to make several tasks appear to work in similar ways and to let various applications share data. In the premiere issue of *A+* last November, I discussed at length various types of integration and what was desirable.

As a company, Apple has been promoting integrated software packages for several years, first on the Lisa, then on the III and the Macintosh, and now on the II family. The Lisa, in fact, originally came with a bundled-in group of six integrated applications whose design presented a similar user interface. Although data interchange among the packages was not perfect (you couldn't move data, for example, from the word processor to the spreadsheet), it was far better than software for alternative machines.

The Macintosh software seems to be taking a similar approach, although only a few of the programs are yet available. Apple has gone even further and heavily promoted a Macintosh software toolkit among independent developers. If developers use Apple's routines and follow the guidelines, the result will be a whole slew of independent programs that share a similar user interface and can exchange data.

Integrated software for the II family, strangely enough, has been quite rare until recently. The popular VisiCalc, VisiPlot, VisiTrend, and VisiFile series and the PFS series of Write, File, Report, and Chart have been the only major popular packages in this market for several years. That situation is about to change, though.

Apple has been promoting integrated software packages for several years.

The new entries are Jane, a heavily promoted package from a start-up company called Arktronics, and AppleWorks, from Apple. Both packages feature simple word processing, databases, and a spreadsheet; both are aimed at less experienced users; and both run on the IIe and IIc (versions of Jane are slated for several other computers as well). Thus far, only Jane supports a mouse.

Jane is an example of an almost complete reliance on graphics and geometry as a command language. Virtually all the menus, including major submenus, involve icons (see figure 2). If you want to type, you choose a pictograph of a typewriter. To cut, choose the scissors. To copy, use the camera.

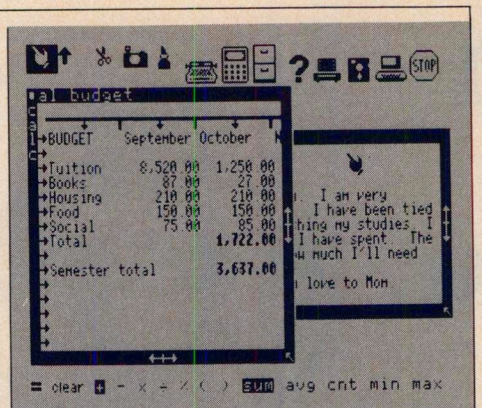

Figure 2: A Jane icon-oriented menu

AppleWorks, on the other hand, is a product that is only beginning to see the world in graphic terms. The original release doesn't use a mouse (but a future version is likely to do so). It does use windows, for normal program displays as well as error messages.

Both of these programs attempt to offer a high degree of integration for commands and a lesser degree for data. In Jane, you choose from a general set of tools for all applications, plus a specialized set for each one. In AppleWorks, several combinations of Apple keys plus letters operate in similar fashion across all applications.

Data flow in these programs is principally a one-way affair. Both will let you take information from the spreadsheet or database and paste it into your word-processor document. In Jane, you cut with the scissors or copy with the camera and then paste with the paste pot. In AppleWorks, you use similar operations to copy to a clipboard file and back. AppleWorks also lets you read in a file stored in the DIF file format set up by VisiCalc or in the Quick File format.

Compared with separate programs, both Jane and AppleWorks represent a great improvement in working style. Both, however, are far from a complete business or personal paperwork solution.

For most of its short history, the computer industry has concentrated on words and numbers. Now that millions of systems with graphics are out in the field, a new style of software seems to be emerging. Watch this column—these new combinations of mice, icons, windows, and integration may represent a great step forward, but they're still not the ultimate panacea. +

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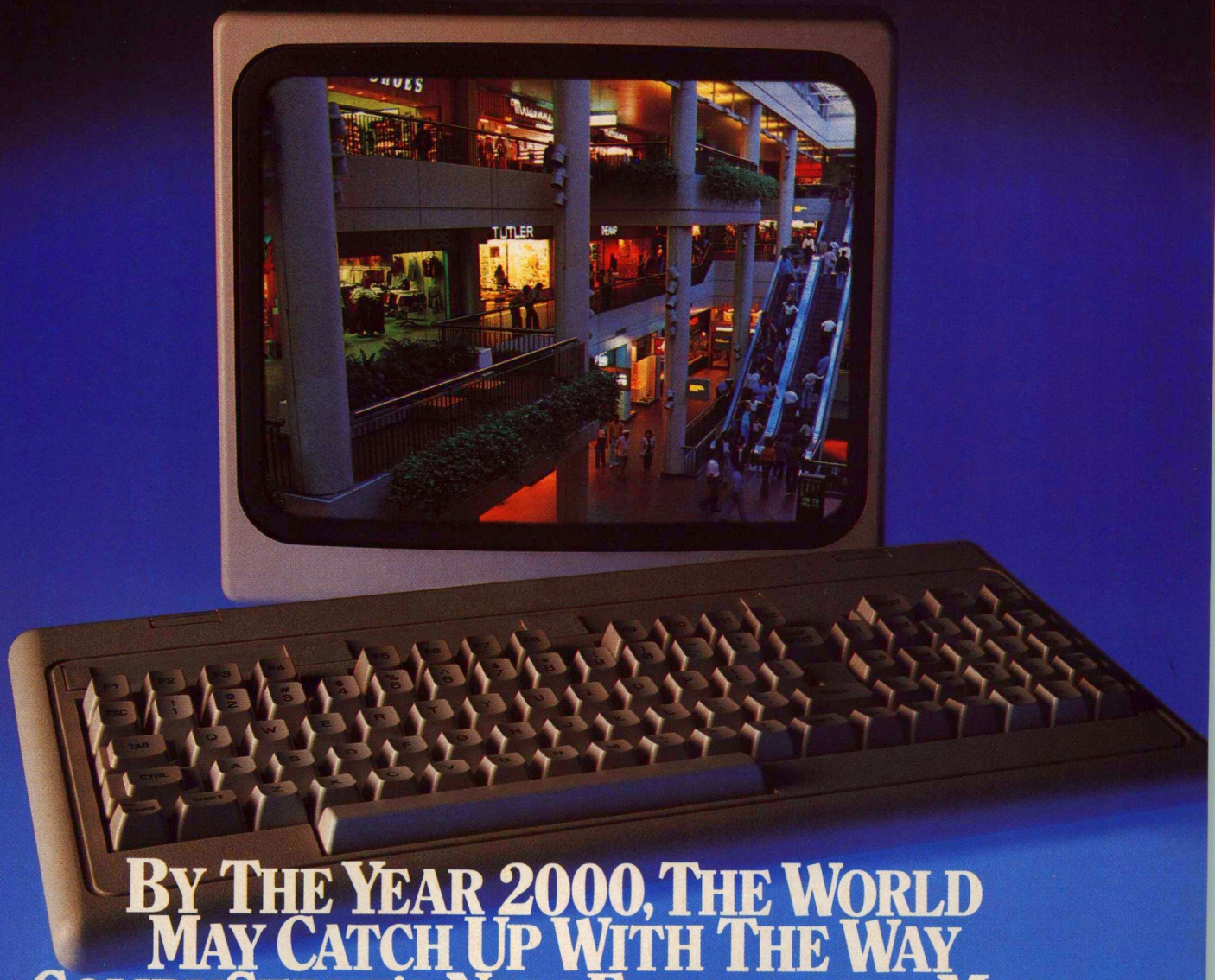

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MICE AND WINDOWS

APPLEWORDS
BY STEVE ROSENTHAL

ACTIVE WINDOW
In a display that divides the screen into regions for separate tasks, the region currently responding to your inputs or showing outputs. Most software for the Apple II family and the Macintosh can have only one active window at a time.

BUTTON
In Apple usage, the term refers to both the push-switch built into the top of the mouse and to certain on-screen symbols. The symbols are the oval and octagonal shapes that contain single choices for you to select with the mouse pointer to indicate what you want done next.

CLICK
To press and release the button on the mouse. To click on a selection, you position the mouse-controlled pointer on the item and then push the mouse's button.

CLIPBOARD
The term Apple uses for a buffer (temporary memory-storage area) where you can save sections of your work that you can later transfer within files or between documents. The clipboard holds only one item at a time, but when you use the Macintosh or the Lisa, you can transfer extra items from the clipboard to the scrapbook.

COPY
To take a selected portion of a screen or document, leaving it intact, and put a duplicate of that portion on the clipboard. From the clipboard, you can paste (copy) it into other documents or into a new place in the same document.

CUT
To take a selected portion of a screen or document, remove it from its current location, and put it on the clipboard. From the clipboard, you can paste (copy) it into other documents or into a new place in the same document. If you don't paste (copy back) the material from the clipboard before cutting or copying something else, the copy on the clipboard is deleted.

DESKTOP
The metaphor (way of presenting the system) of the Macintosh, the Lisa, and several integrated programs for the II family. In this method, you store files on disk, make them available for use by bringing them out onto the desktop, process them, and then store them away again. The idea is to achieve an understandable process by modeling the software on the way people work with papers on their desk. With most desktop software, you can pile several items on the desktop, but most programs let you work only on the top item in the stack.

DOUBLE-CLICK
To allow the single button on the Apple mouse to indicate more than one type of operation, most software interprets two clicks in rapid succession (a double-click) as a different command than two separate clicks. You can specify the timing difference between a double-click and two single clicks by using the Macintosh Control Panel or Lisa's Preferences.

ICON
A pictorial symbol that represents an operation, file, program, peripheral device (such as a printer), or diskette. Icons are also known as "conceptual objects." Because most people find pictures easier to recognize than words, icons let you choose quickly from a group of choices. Most new software from Apple uses at least a few icons to show what choices are available at various times.

MECHANICAL MOUSE
A mouse that depends solely on moving internal parts to relay signals about where you are positioning the device. The advantage of this type of device is that you can use it on most surfaces, so you don't need a special pad or plate. Like any mechanism, however, mechanical mice can eventually wear out.

MOUSE
A palm-size device that you move around on your desk or on a special flat plate to move a corresponding cursor or pointer on your computer screen. Translating the displacement of mice to the movement of the pointer can involve various methods. Apple and many other firms believe that using a mouse for computer input is a method superior to the alternatives, but this belief is still controversial.

OPTICAL MOUSE
A mouse that senses its movement by reading light patterns reflected from a light-emitting diode or lamp into a photocell. Most current models must be used on glass or metal plates printed with special grid patterns, but some newer models are designed to use reflections from ordinary paper or cloth.

OPTOMECHANICAL MOUSE
A mouse such as the Apple mouse that combines both mechanical and optical devices.

POINT
When applied to mouse use, to move the mouse so the cursor indicates a particular choice or object. For example, to point to a word in MacWrite, you move the mouse so the on-screen indicator moves to the spot you want to work on.

POP-UP MENU
A set of choices that is presented only when you select its title or icon. On the Macintosh and the Lisa, they're often called "pull-down" menus because they come down from the top line of the screen.

PULL-DOWN MENU
A "pop-up" menu (one that shows all the choices only when you select its title) that comes down from the top line of the screen. Most software for the Macintosh and the Lisa uses pull-down menus.

TILE
A style of showing more than one task on a single computer screen. With tiled windows, when you add a task, existing ones shrink in size and move aside, leaving room for the new task to be displayed along with existing ones. In contrast to overlaid windows, no window overlaps any other, and the various windows fit together on the screen like pieces of tile on a wall. +

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Apple's popular little rodent has an intriguing history.

A MODERN MOUSE STORY

Twenty years after its invention, the lowly mouse is finally creeping out from behind the backboards and walls of computer science to become a fixture beside computers everywhere. No more cumbersome fiddling with unidirectional cursor keys. The mouse has permanently changed the ways computer users interact with their machines. The original mouse was part of a grand design for helping people boost and complement their own intelligence, but we have yet to feel its full impact on computer technology.

What Is a Mouse, Anyway?

Very simply, a mouse is a hand-held cursor controller that, when moved on a flat surface such as a desktop or a special pad, electronically signals the computer to move the cursor in the same direction on the display screen. Users can also initiate actions with the mouse by clicking a button on the mouse's top.

Mice are sensitive enough to pinpoint a pixel, but can still correct for the wobble of a user's hand to make sure the proper word is deleted from a sentence.

A mouse can propel the cursor across the screen diagonally or in a circle, within a fraction of a second. Have you ever tried to do that while groping over four cursor keys?

The first computer mouse was born at Stanford Research Institute (now SRI International) in 1964. A few years earlier, Douglas Engelbart had joined the institute to explore the interaction between people and computers. With funds from the Pentagon's Advanced Project Research Agency, NASA, and the Air Force's Rome Air Development Center, he established

Inventor Douglas Engelbart has watched the evolution of the mouse from his first wooden prototype to today's streamlined, plastic version.

SRI's Augmented Human Intellect Research Center.

Between 1964 and 1965, the SRI group experimented with various approaches to interactive display work and selection of items on the display screen.

The prototype of today's mouse, conceived by Engelbart and developed by Engelbart and Roger Bates, was a hand-carved wooden box with a single small, red push button in the upper left-hand corner. On the bottom of the box two wheels were mounted at right angles. The wheels were connected to potentiometers that measured changes in movement along vertical and horizontal axes and then translated the analog signals into digital information that told the computer where to move the cursor. (Incidentally, Engelbart originally called the cursor a "bug," continuing the animal-world analogy.)

Engelbart's group tested the mouse and other devices for ease of use among both experienced and inexperienced computer users. Among the devices tested were the light pen, the joystick, a curve tracer called the Grafacon (no longer manufactured), and even a knee control that directed the cursor with up/down or side-to-side movements of the knee. The mouse came out on top for experienced computer users, and all test subjects noted that the mouse was easy to use and caused negligible fatigue.

The mouse was only one of three input devices Engelbart was using at SRI. His SRI system actually encompassed the mouse, a relatively standard keyboard, and a five-function binary keypad that looked like five white piano keys. With the keypad, users can enter short commands without resorting to the keyboard.

In 1968, SRI produced a film demonstrating the tripartite system—Engelbart and his colleagues deftly switched from mouse to keypad, and from keypad to keyboard, editing with speed and bouncing effortlessly through hierarchical menus.

The Mouse Goes to Ground

The Augmented Human Intellect Research Center disbanded, and many of its members moved to Xerox. In 1972, Jack Hawley, an independent consultant and inventor, developed the first digital mouse for Xerox's Palo Alto Research Center. It used simpler software than the original analog mechanical mouse and avoided potentiometers and analog-to-digital converters, though it still rolled on wheels.

In 1975, Xerox again commissioned Hawley to build a mouse, this time to "swat all failure modes" on Willard Opocensky's invention—a mouse that ran on stainless-steel ball bearings and eliminated the wheels' sideslip and drag. The wheels are tucked *inside* the body of the mouse, where they pick up the motion of the ball bearing and translate that motion to digital pulses.

The first mouse was born at Stanford Research Institute in 1964. The prototype was a hand-carved wooden box with a single small, red push button.

Xerox began producing the mouse that Hawley developed in 1981. Hawley licensed his highly popular mouse from Xerox and SRI and now sells it from his own home/factory, the Mouse House in Berkeley, California.

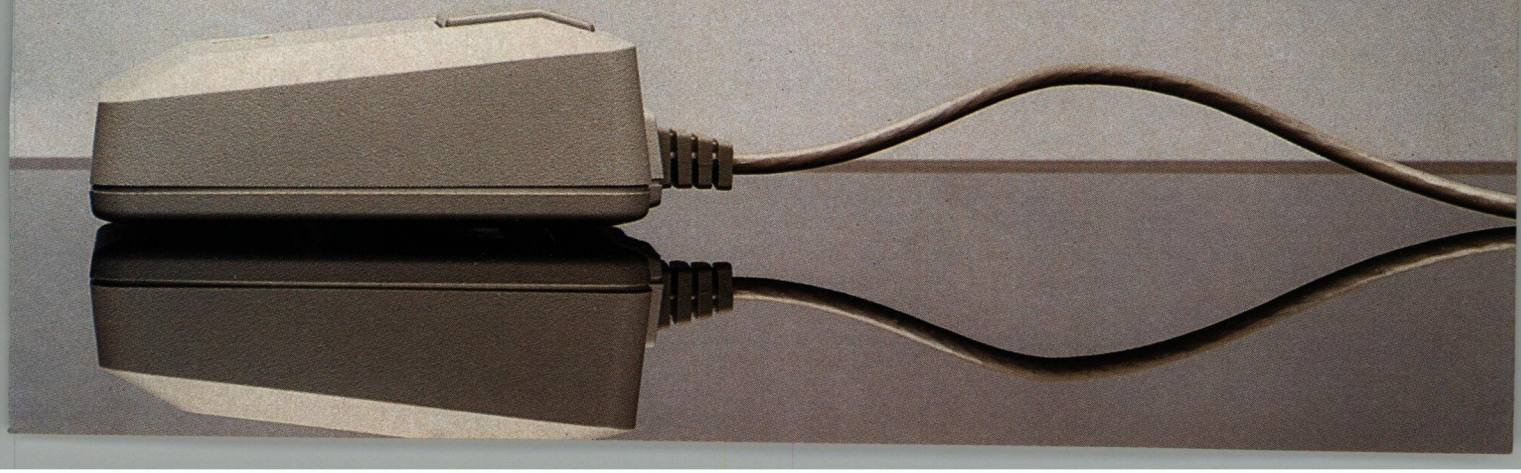
Although the mouse proved to be popular in research and scientific settings, it rarely poked its nose outside of the Xerox buildings until the late 1970s.

Apple Meets the Mouse

The historic meeting between Apple Computer, Inc., and the Xerox-developed mouse took place during several demonstrations in 1979. Various experienced personnel from Apple visited Xerox to examine the Xerox Alto (the internal name for what eventually became the Xerox Star) and to take a gander at Xerox's several mouse-oriented languages—Smalltalk, the Bravo text editor, and the Markup graphics package.

Larry Tesler, at one time applications-software manager for the development of the original Lisa and now a principal engineer at Apple, demonstrated some of these systems to Apple when he worked at Xerox's Office Systems Research Group. Steve Jobs, Mike Scott, John Couch (then head of the Lisa effort), Bill Atkinson, and Jeff Raskin (designer of the original Macintosh), among others, all trooped to Xerox at some point. From what they saw at these demonstrations, Tesler said, "Apple management became convinced that where the future was, for computers, was with some of the ideas that were being used at Xerox."

After Apple saw these demonstrations in late 1979, the company decided



RON SLOAN

to incorporate several of the Xerox ideas into the nascent Lisa—particularly some of the principal features of Smalltalk, a language developed by Alan Kay and expanded by Adele Goldberg and others at Xerox's Learning Research Center. Smalltalk employs many features now familiar to users of the Lisa and the Macintosh, including high-resolution, bit-mapped graphics; a mouse; and overlapping windows.

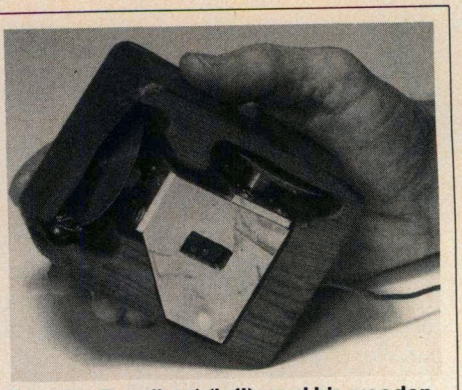
Bill English, now Xerox's director of international marketing, said that Apple's use of the mouse and windows and the recognition Apple subsequently received "really offended some of the developers" at Xerox at first. The Lisa, however, eventually broke marketing ground for systems such as the Xerox Star, which English felt was "ahead of its time in the market."

"The time has come now," English said. Thanks to Apple, customers know what windows are and what a mouse is, "and it's just a matter of selling product features."

Apple Wrestles with the Mouse

Apple engineers originally planned to use the Hawley mouse, Tesler said, but rejected it as too expensive (Hawley mice sell for $300 individually, with bulk discounts). They also considered and rejected the optical mouse.

Eventually they settled on a mechanical mouse that utilized not a tightly gripped ball bearing trapped in a sleeve, but a loose ball.



Douglas Engelbart (left), and his wooden mouse (above)—a box with two wheels, mounted at right angles, which were connected to potentiometers that measured changes in movement.

The Apple mouse has two rubber wheels that rub against the ball and sense its motion, just as the ball bearing does. Because the ball is loose, gradually encrusting dirt doesn't bother it; the dirt "won't jam up the works."

Also, said Tesler, this method was "incredibly cheap"; the tolerances were much lower than those on a ball bearing.

Finally, Apple selected a rubber ball as the tracking ball instead of a metal bearing. The rubber sphere could run on slick surfaces—almost any surface—and would not require a piece of paper or other special pad to operate properly.

Engineers dabbled with mice of dif-

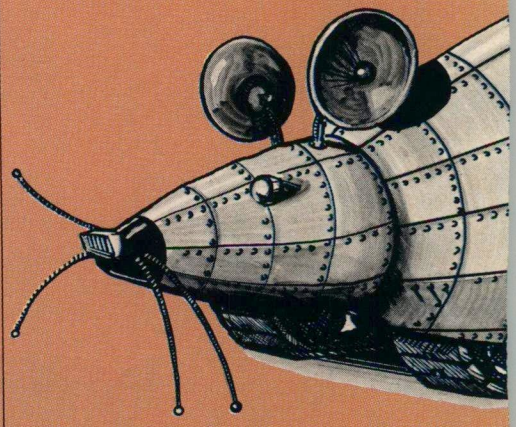
OTHER BREEDS OF MICE

Other versions of the mouse exist besides the analog and digital versions. The "optomechanical" mouse—such as Apple's mouse or the Depraz mouse, which was developed at the Swiss Federal Institute of Technology—operates much like the Hawley-Xerox mouse does, except that it uses optical scanners to detect the motion of the wheels that register the mouse's coordinates.

The directly "optical" mouse dispenses with moving parts and wheels altogether. This kind of mouse slides on a felt, Teflon, or slick plastic base marked with an array of dots or a grid of lines. A lamp inside the mouse illuminates the dots and a lens focuses a mirror-reflected image onto a sensor chip, which recognizes the dot or line pattern. By comparing the patterns as the mouse moves, the chip figures out the mouse's location and transmits that location to the computer, which then moves the cursor on the screen.

Another mouse, called the "hybrid," uses sound and the pressure of the operator's hand to indicate motion. This suede-bottomed mouse, developed by Display Interface Corporation, picks up the sound of the gliding suede as it moves over a flat surface. That sound is detected by a piezoelectric transducer that is tuned to ignore extraneous sound. Also, strain gauges record the drag on the bottom plate of the mouse and translate it to a pantograph within the body of the mouse. An analog-to-digital converter converts these impulses into directions for the cursor.

The duel between these differing mouse technologies rarely subsides.



Proponents of totally optical mice say that mechanical mice need frequent cleaning; mechanical-mouse makers counter that the special optical pad takes up too much desk space.

Vanessa Schnatmeier

ferent sizes and shapes, and with placement and texture of buttons to guide people's fingers. They discovered that small mice were the most maneuverable, so they built the Apple mouse as small as possible, though still packing in all the necessary circuitry.

Why One Button?

In a world of two- and three-button mice, why did Apple decide on the much-maligned one-button mouse, considered plebeian by many other mouse manufacturers?

Tesler says that because most other pointing devices have something other than buttons—a touch screen, for instance, or a finger in the path of a light beam, as in the Hewlett-Packard HP 150 or the Apple Graphics Tablet—Apple decided to design its user-interface software without a multibuttoned mouse.

"People who have developed user interfaces that require multiple buttons are going to have a problem—there isn't going to be any way they can use these other devices," Tesler says. Devices in other than desktop environments can probably use the same software.

For lap-size computers (such as the IIc), though, a mouse won't be appropriate, he noted, and they will have to redesign their software.

Apple believed that the single-button mouse was best for beginners who might get confused about which button to click.

Also, holding down the Apple mouse button and "drawing" down a paragraph to cut and paste elsewhere, for instance, is a more natural motion than fiddling with buttons.

The Lisa mouse evolved through this process. The Macintosh mouse, however, would take another year of engineering to make sure it could be produced in volume. Otherwise, Tesler says, the mouse is basically the same for all Apple products.

The button-eared, cord-tailed electronic mouse took 20 years to reach its audience.

Not Patently Obvious

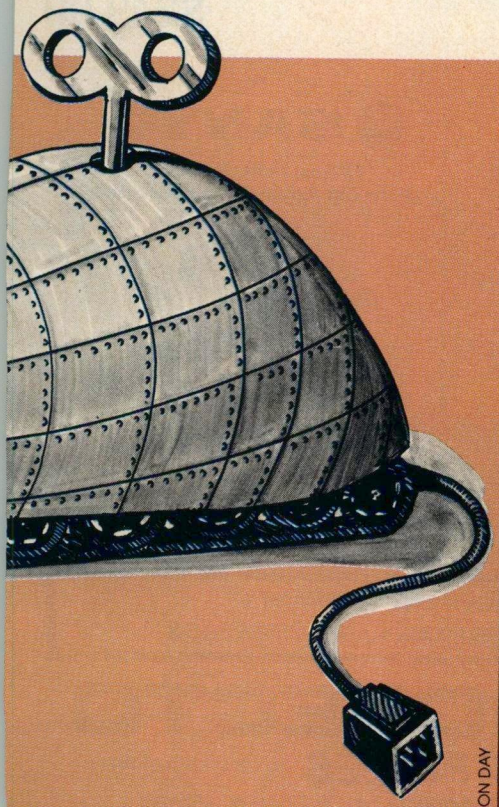
The loose-ball mouse isn't exclusive to Apple, as we know. Apple might have wanted to patent it, but the company missed its chance. "Apple gave a demonstration to a visitor—a well-known professor—without having him sign a confidentiality agreement. He immediately went back and built a mouse based on the same principle and started marketing it, so Apple lost the right to patent it," says Tesler.

The mouse developed by Engelbart et al. at SRI was indeed patented. Such a long time elapsed before the mouse became popular, however, that by the time the Lisa came out, SRI's patent had expired a few months earlier. "The lawyers were looking into it to see what patents we might be infringing on, figuring out if we'd have to pay royalties," explains Tesler. "They finally found the patent, but they said it was about to expire."

Speaking of patents, last year SRI voluntarily presented Doug Engelbart with a check in a sizable, though undisclosed, sum for his work on the mouse (because he worked for SRI, the patent for the mouse device was assigned to SRI).

The button-eared, cord-tailed electronic mouse took 20 years to reach its audience. Still, Engelbart hasn't given up his idea that the mouse is only one part of a high-performance, truly efficient system for human-computer interaction. As senior scientist at Tymshare, Inc., he still uses the keyboard, keypad, and mouse in conjunction with the Augment system he developed at SRI, which Tymshare now owns.

Meanwhile, the mouse's popularity increases daily. As Jack Hawley says, "I expect one-third to one-half of all [computer] workstations will have mice by 1987." The mouse has squeaked through. +



DON DAY

THE ULTIMATE PERIPHERAL

Kiss those mice and light pens goodbye—what an awful thought—they're going to be museum pieces sooner than we think.

A Japanese firm is experimenting with infrared-light readings of eye movements to speed the play of video games. The computer applications are obvious: no more keyboard, no more touchpad, move the cursor with your eyes.

Better yet, a researcher at Smith-Kettlewell Institute in San Francisco has come up with a way to communicate with your Apple just by thinking. His device, something like a thinking cap, attaches electrodes to your scalp that pick up and amplify brain waves. Special software allows you to display words on your terminal or, with the proper peripherals, turn on your house lights.

Ron Seaman, president of World Class, Inc., in Chicago, says he will soon be marketing a sonar-control device for computers that uses a sensing mechanism small enough to fit on the tip of a finger.

At MIT cursor innovation has centered on radar and voice recognition. The school's spatial digitizer, using radar technology, allows users to point at screen positions to move the cursor and issue commands. Voice input can work in conjunction with or independently of the radar controls. At this point, the computer has a limited vocabulary, but the combination of voice recognition and the spatial digitizer suggests wide applications.

Leslie Baker and Nat Sakowski

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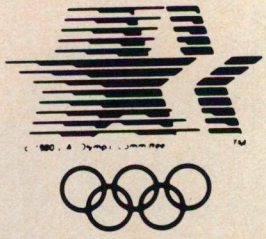

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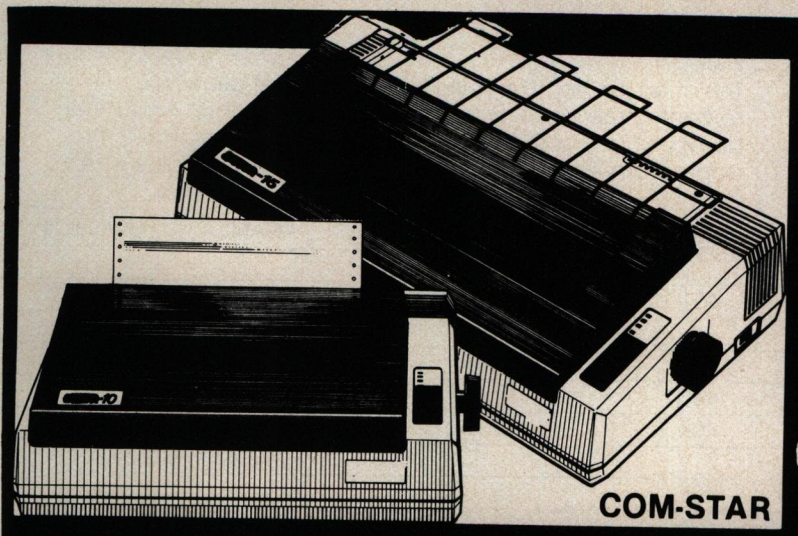

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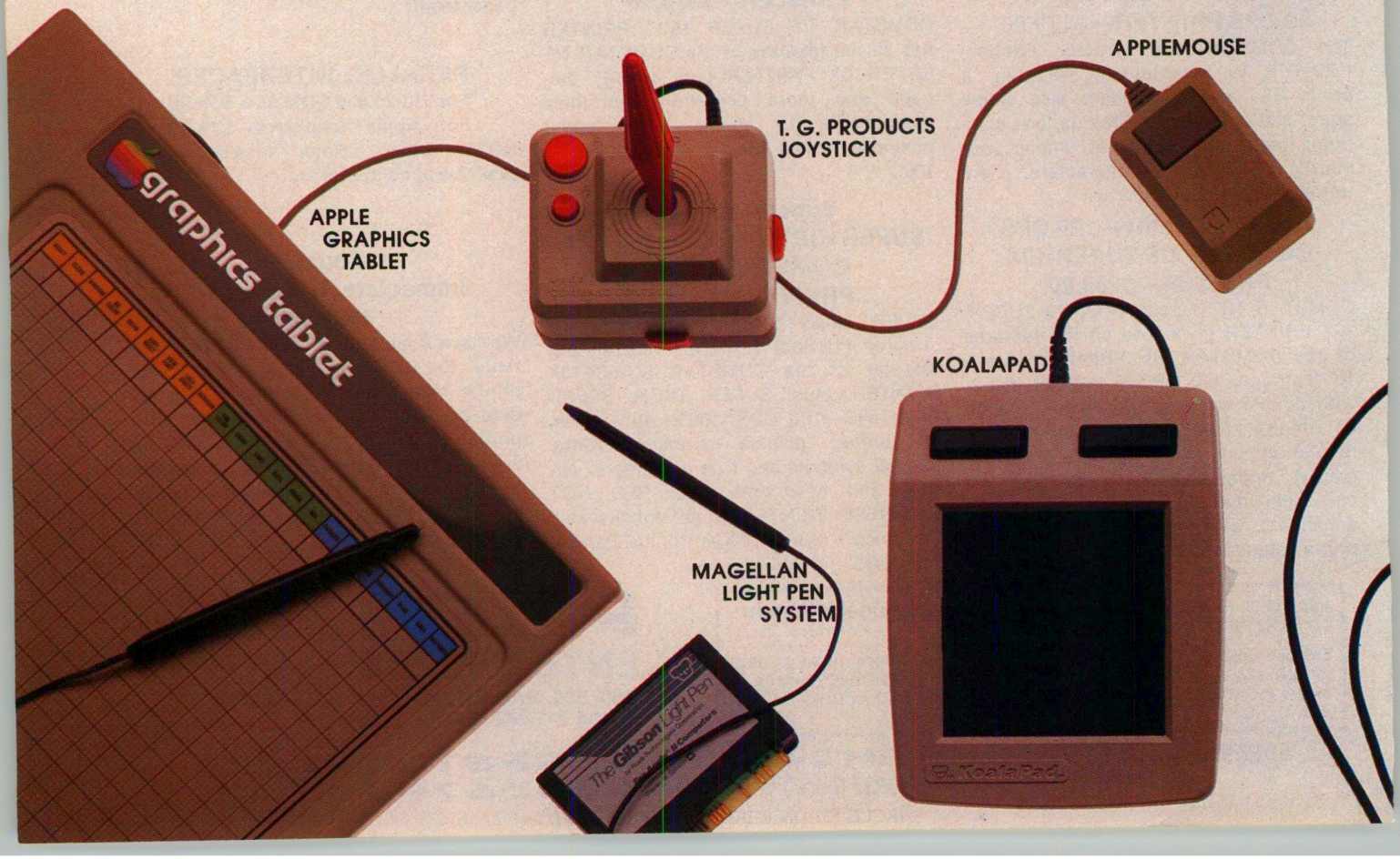
CURSOR CONTROLLERS

This chart lists some Apple IIe products that allow you to control the cursor without using the keyboard. For further details on any of these products, circle the appropriate Reader Service Card number in this issue of *A+*.

PRODUCT	COMPANY	CARD #	PRICE	USE	
				GAME	GRAPHICS
MOUSE					
AppleMouse	Apple Computer	401	$149.00		
GAME PADDLE					
Hand Controller	Apple Computer	402	34.95		
AGP200	T.G. Products	403	34.95		
AGE200	T.G. Products	404	34.95		
GRAPHICS TABLET					
Apple Graphics Tablet	Apple Computer	405	795.00		
HiPad	Houston Instruments	406	835.00		
JOYSTICK					
Joystick	Apple Computer	407	59.95		
Kraft Premium	Kraft	408	49.95		
AJS200	T.G. Products	409	44.95		
Analog 50-1030	Wico	410	34.95		
LIGHT PEN					
Gibson Light Pen System	Koala Technologies	411	249.95		
Magellan Super Pen II	Magellan Computer	412	149.95		
Magellan Light Pen System	Magellan Computer	413	149.00		
TOUCHPAD					
Power Pad	Chalkboard	414	99.95		
KoalaPad	Koala Technologies	415	125.00		
TRACKBALL					
Digit-Ball	Interfirm Systems	416	99.95		
ATB600	T.G. Products	417	39.95		
ATE600	T.G. Products	418	39.95		



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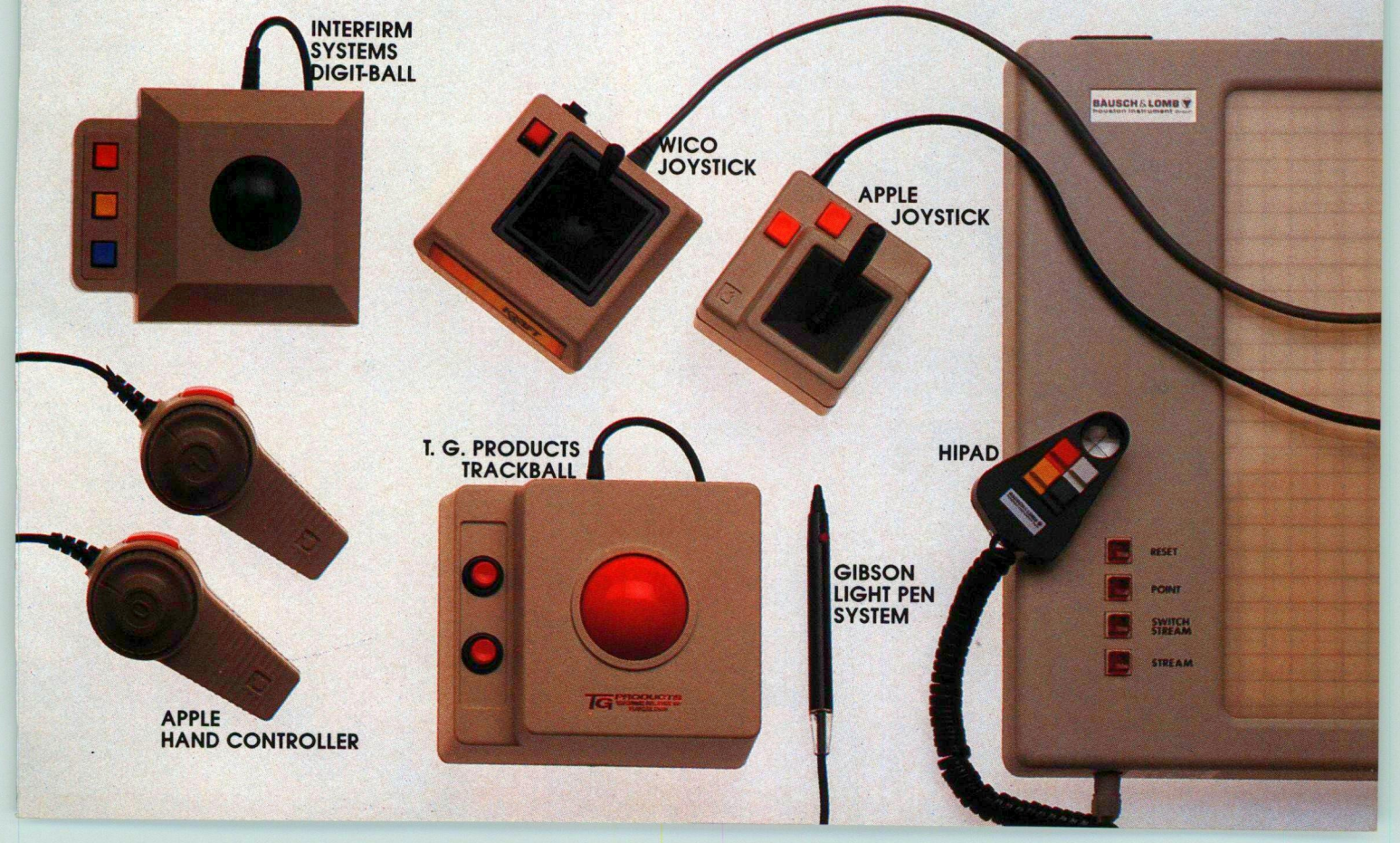


▶ SOFTWARE REVIEW/BY BYRON RYONO

ENTER THE THREE DIMENSIONS OF APPLEWORKS

Swapping diskettes to switch from one program to another, then back to the first or even to a third program is a nuisance. Once you've swapped diskettes, you also have to prepare yourself for a new command set and program personality. Do you really have to put up with this situation? Not according to AppleWorks, a new software package from Apple Computer that offers a word processor, a database manager, and a spreadsheet, all in one versatile program.

AppleWorks is an integrated software package that you operate with a combination of menus and commands. The term *integrated* has many possible definitions, and AppleWorks defines its integration in three levels.

One level of integration is its standard set of commands that you use similarly in all three applications. If you have ever moved from one program to another, you know that trying to remember "which command does what" is a logistical headache.

On another level, AppleWorks lets you move from one application to another without swapping diskettes. In fact, AppleWorks employs a "desktop" concept that allows you to retrieve up to 12 files from a diskette into your desktop (your Apple's RAM). Thus, you get fast transitions from one file to another within the same application or between different applications. If you have 128K of total RAM, your desktop will hold 55K. Various displays tell you how much memory each file consumes, as well as the amount of remaining desktop space you have available. (You can theoretically run AppleWorks with only 64K of RAM, but the limited memory is too restrictive—this article alone would not fit on the desktop.)

Finally, AppleWorks is integrated in that it lets you move information between files of the same application; you can also remove information from all three applications to word-processing files. You move information around with AppleWorks' "cut and paste" feature; you "cut" information from one file and "paste" it into another file. After you cut the information and before you paste it, the cut information temporarily resides in your "clipboard," another storage area in your RAM. You can put up to 250 lines of cut information into your clipboard.

> A word processor, database manager, and spreadsheet —all in one integrated package

AppleWorks' integration does not include the ability to substitute items from a database into selected places in a word-processing document. For instance, you cannot create a form letter that incorporates addresses and salutations from information in your address database file. Neither can you retrieve information from a database and insert it into your spreadsheet.

All in all, despite these weaknesses, AppleWorks' integration still gives you increased productivity and versatility.

Training Materials and Documentation

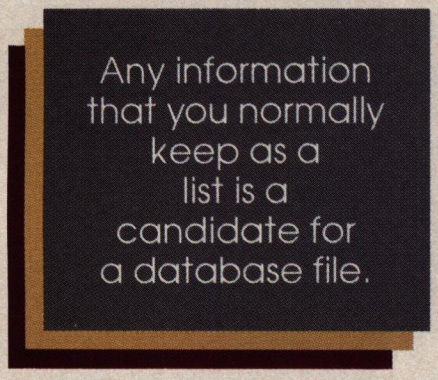
AppleWorks' training material and documentation ease you into becoming a proficient user. You begin with the "Apple Presents AppleWorks" tutorial, which consists of a series of carefully designed interactive learning experiences. AppleWorks leads you through its basic commands, keystrokes, and features; you receive explanations, followed by tasks to perform. Since the AppleWorks tutorial comes on two disks (Volumes 1 and 2) and covers several separate topics, you can proceed at your own pace, starting, stopping, repeating, or skipping topics at your discretion. What's more, the training is idiotproof—I tried to confuse the program on several occasions, sometimes inadvertently, and the training disk always had a direct but gentle response.

LANCE JACKSON

By the time you are done, you can confidently move among all three applications. Once you have reached a functional level of expertise, mastery of all the details is a matter of desire and necessity.

Depending on your prior experience with word processors, databases, and spreadsheets, you can elect to step through all or none of AppleWorks' *Tutorial Manual*. The tutorial builds on the basics you learned from the training disk. It directs you through prepared examples that use sample files from the Sample File diskette. You move through the practical aspects of the programs, the regular functions that you perform every day after you've established your document, database, or spreadsheet. The tutorial includes functions such as editing, updating, analyzing, moving, copying, cutting and pasting, reporting, and printing.

The nitty-gritty of building a document, a database, and a spreadsheet is reserved for the *AppleWorks Reference Manual*. For each application, the manual includes instructions that follow a sequence from planning and creating files, through daily functions, to printing documents and reports. Thus, the reference manual acts as an additional tutorial.



If you want to learn how to perform a specific function, you must find the information within each application's informational sequence by using the table of contents and the index. For the most part, I had no problem finding certain procedures, though a few pieces of information were buried in the middle of a wider discussion.

The information itself is well written, with occasional snippets of humor. One particularly helpful feature is the AppleWorks Tips, which offers hints for efficient approaches to common tasks. For experienced users, the manual also includes command shortcuts that speed up some function requests.

One slight failing of the reference manual is that it lacks detailed information on file-storage calculations. All it provides is some rough guidelines on file-size limitations.

AppleWorks also includes an on-line help feature that lets you request assistance almost anywhere in the program. If that doesn't suit you, the Quick Reference Card in the reference manual may be more to your liking. In sum, AppleWorks' training materials and user documentation represent an effort that users deserve and should expect from any software package.

The AppleWorks Word Processor

The AppleWorks Word Processor is essentially a "what you see is what you get" type of word processor. You can type your text and then format your document as you please or take advantage of formatting options throughout your document. With formatting options, you can move your margins in and out, change line spacing, change print density, and justify or center text. You can also print your text with boldface, underlining, superscripts, or subscripts.

Although the formatting options provide necessary features, the method for specifying options bothers me. You have to request the Format Options menu, choose the desired type of format change, enter the change, and return to your document. When you want to undo the change, you have to repeat the sequence. So, to take advantage of AppleWorks' formatting features, you have to pay the price of a little inconvenience.

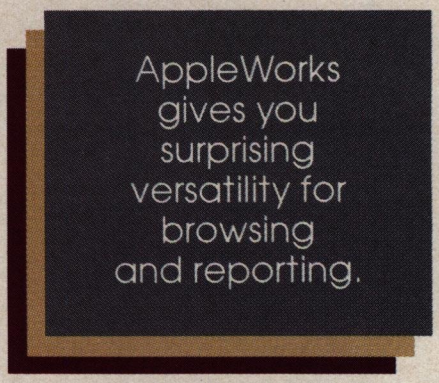
When you have 128K RAM, a word-processing document is limited to 1536 lines of text, or about 28 pages of 54-line, single-spaced text. That's a good-size document, large enough to suit most peoples' needs. At worst, you will have to split larger documents into smaller files.

The AppleWorks Database

AppleWorks' Database organizes information like a filing cabinet does. In a database, related information is contained in a file, and each file has a record design that includes categories that you define. Any information that you normally keep as a list is a candidate for a database file. Say you want to organize your favorite recipes. The categories (fields) for your recipe file might be NAME, COURSE, PREP TIME, MAIN INGREDIENT, COOKBOOK, SERVE WITH, and COMMENTS. You enter each recipe as a record in the file.

When you create a database file, you can build it from scratch, or you can build it from information contained in other sources. AppleWorks accepts data from ASCII, DIF, VisiCalc, or Quick File files. You can have up to 30 fields per record. If you have 128K RAM, about 750 records, averaging 75 characters each, can fit in one file.

Once you've established your database, the payoff comes when you need to browse or report your file's contents. AppleWorks gives you surprising versatility for browsing and reporting. You can view the contents of your file in single-record or multiple-record formats. The single-record format displays all the categories of information for one record per screen, and the multiple-record format, which you design, displays many records per screen.



Not only do you get the single- and multiple-record formats, but you can also zoom in and out of both. Zooming out allows you to get an overall look at the contents of your file in the multiple-record format and then focus on any particular record with the single-record format (or vice versa), as you please. You can include all the records in your file or choose subsets of records based on common entries. For instance, include all recipes that have the word *chocolate* as a part of any field.

AppleWorks offers you two styles of reports: label style for printing information in a freestyle arrangement and table style for printing a traditional row-and-column report. You can use all your records in a report or select records that share one or more common attributes. In table-style reports, you can define a category that contains results of calculations based on numeric information in existing categories. Totals and subtotals are also available.

The AppleWorks Spreadsheet

A spreadsheet enables you to lay out and model financial or numeric interrelationships on a row and column worksheet. The maximum size of AppleWorks' worksheet is 999 rows

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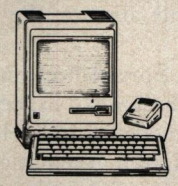

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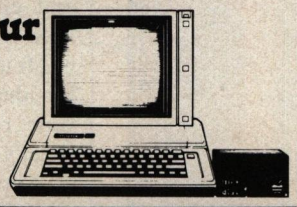

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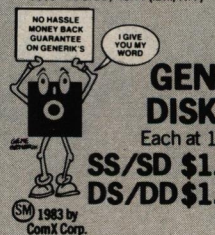

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and 127 columns (each nine characters wide), for a total of 126,873 empty cells. For filled cells, however, the maximum practical limit with 128K RAM is about 6000 cells, because of memory restrictions.

You determine the worksheet layout and choose the calculations that you need to perform. The Sample File disk has four examples that you can examine for ideas if you need them. Otherwise, your requirements dictate the worksheet's design.

AppleWorks' Spreadsheet includes all the basic features you'd expect from a mathematical modeling tool. Here's a partial list: standard mathematical calculations; arithmetic functions such as sum, absolute value, square root, and average; the financial function of net present value; the logical function of if; and choose or lookup tables. Since worksheets are typically larger than one screen can display, you can choose to split the screen horizontally or vertically in order to view simultaneously two portions of your worksheet that are physically separated. To assist you in refining and enhancing your worksheet, AppleWorks provides flexible editing, inserting, copying, and moving functions. AppleWorks' Spreadsheet includes all the basics you expect, and then some.

The Right Direction

AppleWorks exemplifies the direction that software applications are heading—toward integration in which commands are consistent, in which moving from application to application is easy and fast, and in which you can transfer information from one application to another.

If you like the advantages of the increased productivity, versatility, and ease of use that result from AppleWorks' integration of its word processor, database manager, and spreadsheet, then you should take the time to explore and experience this new program. It's worth a look. +

▶ PRODUCT INFORMATION

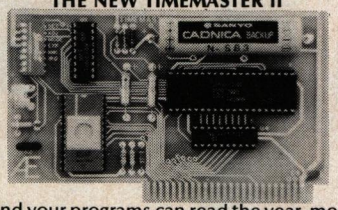
AppleWorks
Apple Computer, Inc.
20525 Mariani Avenue
Cupertino, CA 95014
(408) 996-1010
List Price: $20 for the Apple IIe
Requires: Apple IIe with 64K RAM, 80-Column Text Card, one disk drive, Extended 80-Column Text Card (additional 64K RAM) recommended; or Apple IIc

Apple Peripherals Are All We Make

That's Why We're So Good At It!

THE NEW TIMEMASTER II

Automatically date stamps files with PRO-DOS



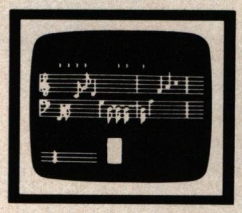
NEW 1984 DESIGN
An official PRO-DOS Clock

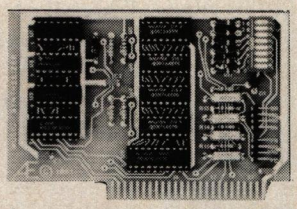
- Just plug it in and your programs can read the year, month, date, day, and time to 1 millisecond! The only clock with both year and ms.
- NiCad battery keeps the TIMEMASTER II running for over ten years.
- Full emulation of ALL other clocks. Yes, we emulate Brand A, Brand T, Brand P, Brand C, Brand S and Brand M too. It's easy for the TIMEMASTER to emulate other clocks, we just drop off features. That's why we can emulate others, but others CAN'T emulate us.
- The TIMEMASTER II will automatically emulate the correct clock card for the software you're using. You can also give the TIMEMASTER II a simple command to tell it which clock to emulate (but you'll like the Timemaster mode better). This is great for writing programs for those poor unfortunates that bought some other clock card.
- Basic, Machine Code, CP/M and Pascal software on 2 disks!
- Eight software controlled interrupts so you can execute two programs at the same time (many examples are included).
- On-board timer lets you time any interval up to 48 days long down to the nearest millisecond.

The TIMEMASTER II includes 2 disks with some really fantastic time oriented programs (over 40) including appointment book so you'll never forget to do anything again. Enter your appointments up to a year in advance then forget them. Plus DOS dater so it will automatically add the date when disk files are created or modified. The disk is over a $200.00 value alone—we give the software others sell. All software packages for business, data base management and communications are made to read the TIMEMASTER II. If you want the most powerful and the easiest to use clock for your Apple, you want a TIMEMASTER II.

PRICE $129.00

Super Music Synthesizer
Improved Hardware and Software

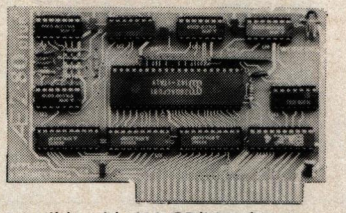




- Complete 16 voice music synthesizer on one card. Just plug it into your Apple, connect the audio cable (supplied) to your stereo, boot the disk supplied and you are ready to input and play songs.
- It's easy to program music with our compose software. You will start right away at inputting your favorite songs. The Hi-Res screen shows what you have entered in standard sheet music format.
- Now with new improved software for the easiest and the fastest music input system available anywhere.
- We give you lots of software. In addition to Compose and Play programs, 2 disks are filled with over 30 songs ready to play.
- Easy to program in Basic to generate complex sound effects. Now your games can have explosions, phaser zaps, train whistles, death cries. You name it, this card can do it.
- Four white noise generators which are great for sound effects.
- Plays music in true stereo as well as true discrete quadraphonic.
- Full control of attack, volume, decay, sustain and release.
- Will play songs written for ALF synthesizer (ALF software will not take advantage of all our card's features. Their software sounds the same in our synthesizer.)
- Our card will play notes from 30HZ to beyond human hearing.
- Automatic shutoff on power-up or if reset is pushed.
- Many many more features.

PRICE $159.00

Z-80 PLUS!



- TOTALLY compatible with ALL CP/M software.
- The only Z-80 card with a special 2K "CP/M detector" chip.
- Fully compatible with microsoft disks (no pre-boot required).
- Specifically designed for high speed operation in the Apple IIe (runs just as fast in the II+ and Franklin).
- Runs WORD STAR, dBASE II, COBOL-80, FORTRAN-80, PEACHTREE and ALL other CP/M software with no pre-boot.
- A semi-custom I.C. and a low parts count allows the Z-80 Plus to fly thru CP/M programs at a very low power level. (We use the Z-80A at fast 4MHZ.)
- Does EVERYTHING the other Z-80 boards do, plus Z-80 interrupts.

Don't confuse the Z-80 Plus with crude copies of the microsoft card. The Z-80 Plus employs a much more sophisticated and reliable design. With the Z-80 Plus you can access the largest body of software in existence. Two computers in one and the advantages of both, all at an unbelievably low price.

PRICE $139.00

Viewmaster 80

There used to be about a dozen 80 column cards for the Apple, now there's only ONE.

- TOTALLY Videx Compatible.
- 80 characters by 24 lines, with a sharp 7x9 dot matrix.
- On-board 40/80 soft video switch with manual 40 column override
- Fully compatible with ALL Apple languages and software—there are NO exceptions.
- Low power consumption through the use of CMOS devices.
- All connections are made with standard video connectors.
- Both upper and lower case characters are standard.
- All new design (using a new Microprocessor based C.R.T. controller) for a beautiful razor sharp display.
- The VIEWMASTER incorporates all the features of all other 80 column cards, plus many new improvements.

	PRICE	BUILT IN SOFTSWITCH	SHIFT KEY SUPPORT	LOW POWER DESIGN	80 COLUMN HOME	7x9 DOT MATRIX	LIGHT PEN INPUTS	40 COLUMN OVERRIDE	INVERSE CHARACTERS
VIEWMASTER	**179**	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**
SUP'RTERM	MORE	NO	YES	NO	NO	NO	NO	YES	YES
WIZARD80	MORE	NO	NO	NO	NO	YES	NO	YES	YES
VISION80	MORE	YES	YES	NO	NO	YES	NO	NO	NO
OMNIVISION	MORE	NO	YES	NO	NO	NO	NO	YES	YES
VIEWMAX80	MORE	YES	YES	NO	NO	YES	NO	NO	YES
SMARTERM	MORE	YES	YES	NO	NO	NO	YES	YES	NO
VIDEOTERM	MORE	NO	NO	YES	NO	YES	YES	NO	YES

The VIEWMASTER 80 works with all 80 column applications including CP/M, Pascal, WordStar, Format II, Easywriter, Apple Writer II, VisiCalc, and all others. The VIEWMASTER 80 is THE MOST compatible 80 column card you can buy at ANY price!

PRICE $179.00

MemoryMaster IIe 128K RAM Card

- Expands your Apple IIe to 192K memory.
- Provides an 80 column text display.
- Compatible with all Apple IIe 80 column and extended 80 column card software (same physical size as Apple's 64K card).
- Can be used as a solid state disk drive to make your programs run up to 20 times FASTER (the 64K configuration will act as half a drive).
- Permits your IIe to use the new double high resolution graphics.
- Automatically expands Visicalc to 95 K storage in 80 columns! The 64K config. is all that's needed, 128K can take you even higher.
- PRO-DOS will use the MemoryMaster IIe as a high speed disk drive.
- Precision software disk emulation for Basic, Pascal and CP/M is available at a very low cost. NOT copy protected.
- Documentation included, we show you how to use all 192K.

If you already have Apple's 64K card, just order the MEMORYMASTER IIe with 64K and use the 64K from your old board to give you a full 128K. (The board is fully socketed so you simply plug in more chips.)

MemoryMaster IIe with 128K	**$249**
Upgradeable MemoryMaster IIe with 64K	**$169**
Non-Upgradeable MemoryMaster IIe with 64K	**$149**

Our boards are far superior to most of the consumer electronics made today. All I.C.'s are in high quality sockets with mil-spec. components used throughout. P.C. boards are glass-epoxy with gold contacts. Made in America to be the best in the world. All products work in the APPLE IIE, II, II+ and Franklin. The MemoryMaster IIe is IIe only. Applied Engineering also manufactures a full line of data acquisition and control products for the Apple; A/D converters and digital I/O cards, etc. Please call for more information. All our products are fully tested with complete documentation and available for immediate delivery. All products are guaranteed with a no hassle **THREE YEAR WARRANTY.**

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KEYPORT 717

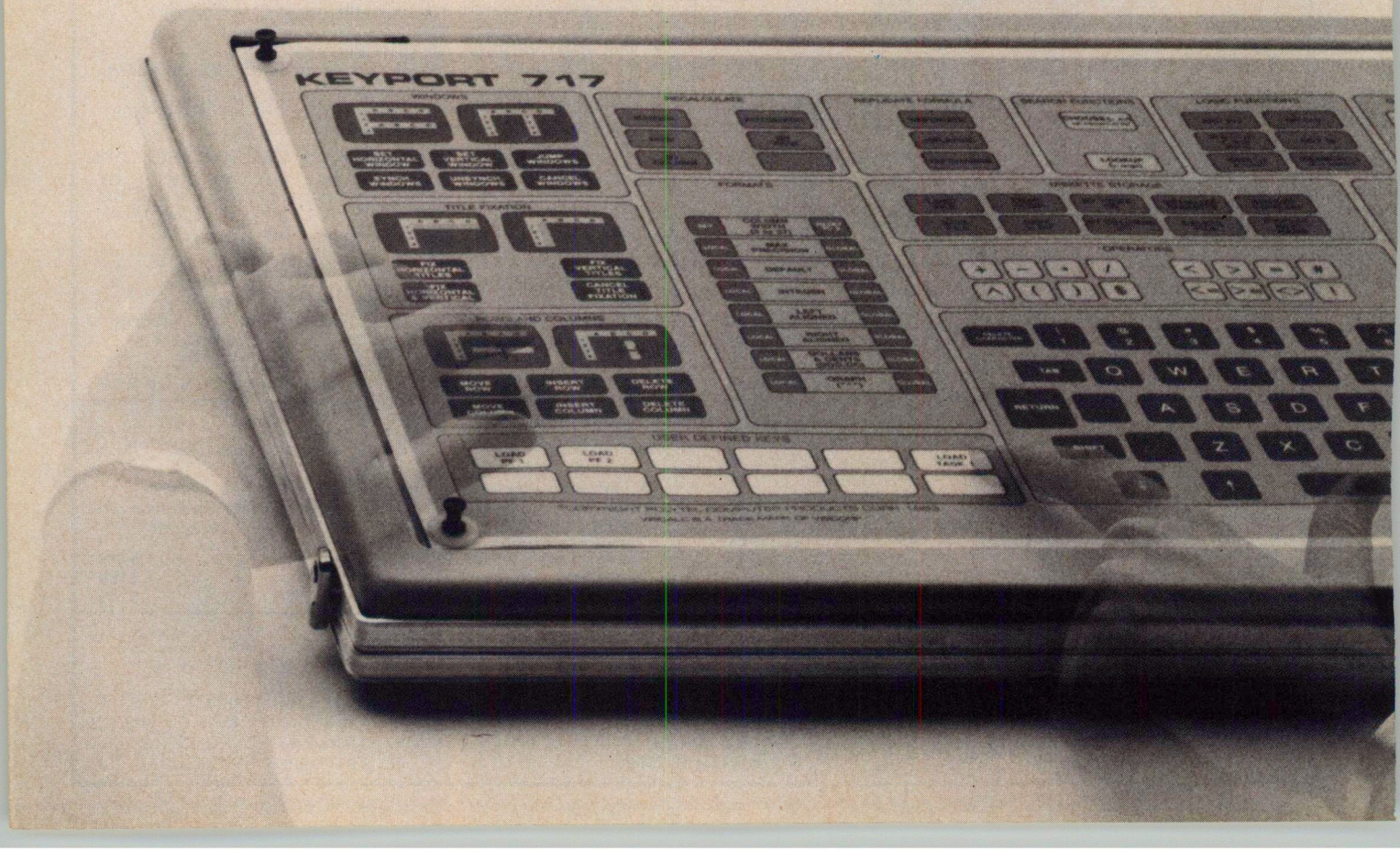
The standard QWERTY keyboard, the story goes, was originally designed to *slow* typing speed, in order to avoid collision among the most frequently used typewriter character bars. With a Control key, you gain additional functions on your microcomputer, but keyboard input has remained mostly a matter of one function per keystroke since the 19th century—until now.

A new keyboard from Polytel Computer Products has taken the concept of programmable keystroke function and enlarged upon it so dramatically that keyboard input now holds as much potential for application variety as do our disk drives. The Keyport 717 is a programmable keyboard named for the 717 user-programmable keys on its flat, membrane surface.

Extravagant Expansion

Although the notion of a programmable keyboard is not new, the Keyport 717 distinguishes itself on two counts.

First, its 717 programmable keys are an extravagant expansion of the programmable-key concept. And second, it offers "keyboard software" that activates the individually programmed keys on the keyboard itself. Each application program uses a custom-designed



plastic keyboard overlay that displays the program functions. This software/overlay combination permits single-keystroke entry of command codes that might otherwise require numerous, complex keystroke codes.

The product initially includes several familiar application programs, and users can also program their own applications on a blank programming template that comes with the basic unit.

The Keyport 717 is, at first glance, large. The lightweight cabinet measures 13 × 26 inches, with a depth of 1 inch at the front, sloping to 2 inches at the rear. The actual keyboard takes up nearly all of the top surface.

A single cable connects the Keyport directly into the 9-pin hand-control connector on the back of the Apple II computer or into the game I/O socket inside the Apple II and II Plus computers, with an adapter. It requires 48K RAM and one 16-sector disk drive, but no interface card or power supply is necessary. In most applications, the Keyport does not disable the standard alphanumeric keyboard. The keyboard is not only washable, but it is actually impervious to that gravest of threats to microcomputers—spilled beverages.

717 PROGRAMMABLE KEYS ON A MEMBRANE SURFACE SPELL SPEED AND CONVENIENCE.

With the keystroke codes for each application program clearly displayed on keyboard overlays, users can see, select, and enter commands with a single key—conceivably without referring to the application manual.

Front and center on the template is a rendition of an Apple-like keyboard, including four arrow keys for cursor control, Shift, and Caps Lock keys. Additional key groupings provide programming commands. Commands for related functions are grouped together by color on the templates, making them easy to find and use. When you don't have to memorize command-code sequences, data entry tends to be simpler, faster, and more accurate.

The Keyport 717 has no moving parts or integrated circuits that can fail; it is lightweight, yet sturdy; and as keyboards go, its cost per key is low.

Configuration

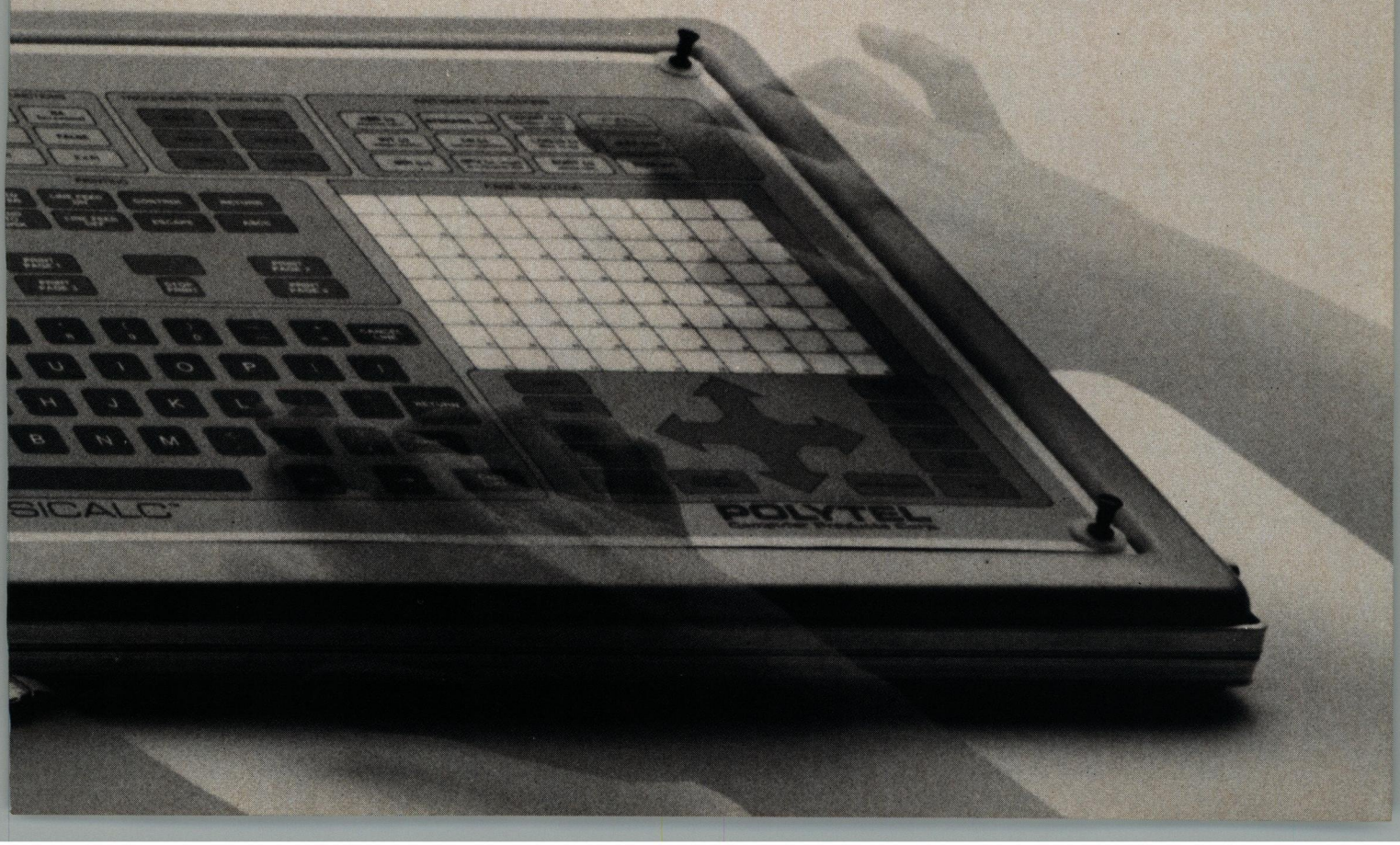
Setup of the Keyport is a breeze. After connecting it to your Apple, settle back into a comfortable chair. If you choose the right chair, you can rest the keyboard in front of you, across the arms of the chair itself, creating a comfortable and convenient work surface.

In addition to the membrane keyboard and plastic overlay, each application involves a program diskette for activating the programmed keys.

Boot the program disk for the chosen application and then—only the first time you use it—"calibrate" the board. To do so, touch one column, and one row, of keys, one by one. The computer then permanently stores the values of these x- and y-coordinate keys and uses them to identify any pressed key on the Keyport. Once the Keyport is calibrated, you're ready to put it to work.

Packaged Applications

The initial program offerings are a template for BASIC programming functions; another for VisiCalc functions; a third called The Farm, which is a children's interactive reading/writing/learning game; and the do-it-yourself programming option. A package for Apple Writer IIe is the next appli-



TOM McAFEE

cation scheduled for release, with more on the way.

BASIC

The BASIC programming overlay includes keys for all AppleSoft BASIC and DOS commands, plus features such as auto-line number; four-directional, non-destructive cursor for editing; auto-repeat for all keys; user-definable keys; and color keys.

With the BASIC overlay on the keyboard and the BASIC diskette booted, you press any key to enter its command. For example, in order to generate CATALOG D2, you need only touch the CATALOG D2 key on the BASIC overlay. Or to generate the BASIC instruction COLOR = 13, you touch the yellow key in the COLORS section of the low-resolution graphics; you don't have to remember that the code for yellow is 13.

The Keyport has two types of predefined keys—Character String keys, and Function keys.

Character String keys always output the same characters. Function keys either perform a specific function or output a different set of characters each time you press them. For example, the Character String key RETURN outputs the same code (a carriage return) every time you press the key. The Function key RETURN & NEW LINE NUMBER outputs a carriage return and a different line number each time you press it.

Another example is the Function key LINE START. This key does not output any characters, but it prompts you to enter the starting line number for the automatic-line-numbering feature.

You can redefine any of the keys by using the Define Board program, described in the *Programmer Reference Manual.*

The BASIC boot disk not only configures the keyboard as outlined here, but it also contains a BASIC demo program that illustrates the full value of the system to a beginning programmer. Written by Kris Kimbrough, the program walks users through all the key groups and BASIC command codes. Newcomers to BASIC will appreciate this demo, just as hunt-and-peck typists will welcome the programmed keystroke functions.

VisiCalc

VisiCalc users know the difficulty of remembering complex keystroke commands to set up and operate their electronic spreadsheets. Unless users work with VisiCalc regularly, they can spend considerable time with the reference manual, looking up codes. With the Keyport 717 VisiCalc overlay, all commands are clearly displayed, reducing lengthy keystroke sequences to a single key.

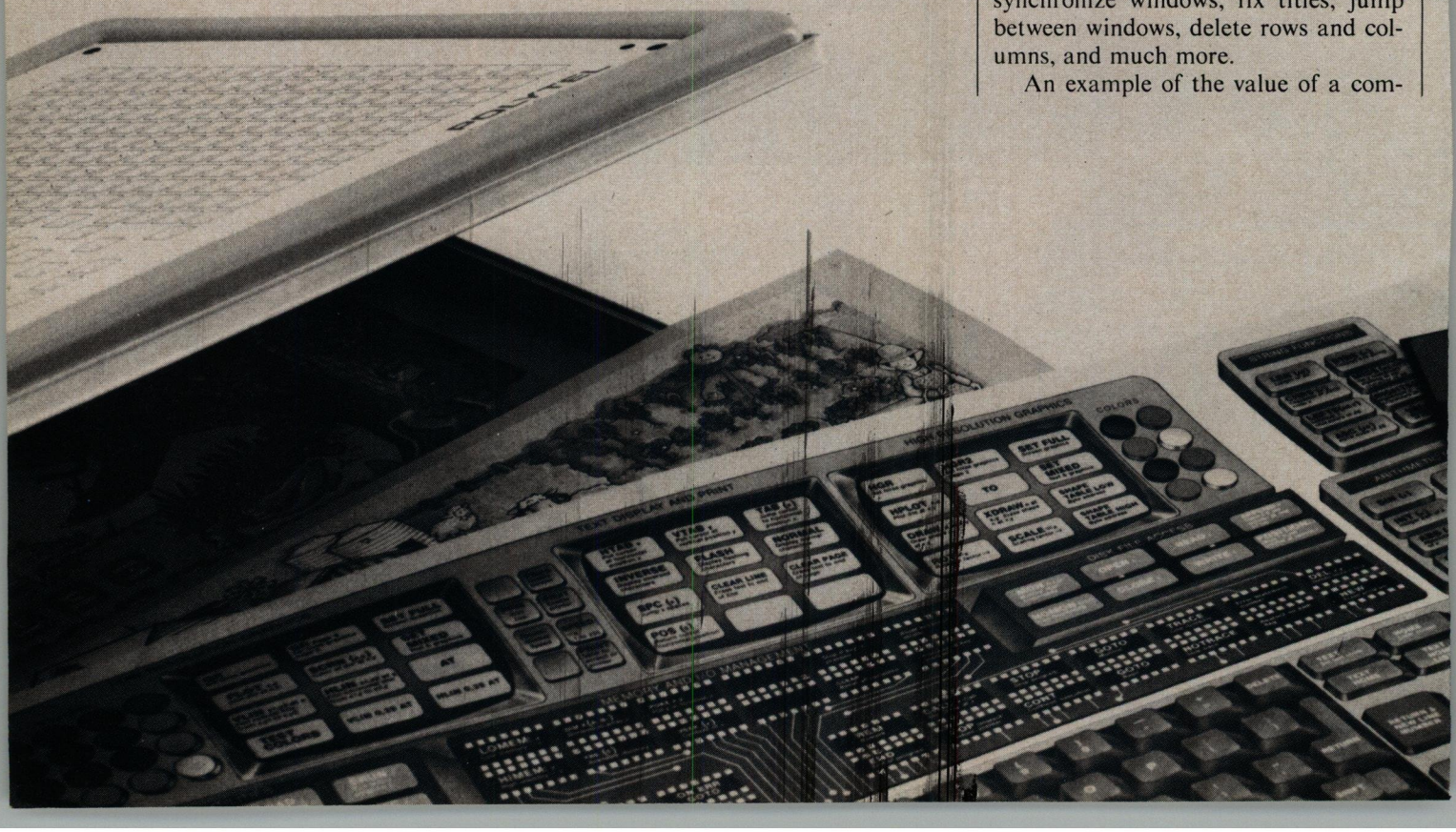
You start by booting the VisiCalc interface disk, calibrating the keyboard, pinning down your VisiCalc keyboard overlay, and booting your VisiCalc program diskette.

At this point, you can see the whole range of VisiCalc commands before you, each one ready to be executed at the touch of a single key.

Certain keys give you special combined commands. For example, a single key generates a sequence equivalent to /—, allowing you to fill a cell with a dash and move to the next cell. This feature is especially helpful for underlining titles.

With single keystrokes, you can split the screen horizontally or vertically, synchronize windows, fix titles, jump between windows, delete rows and columns, and much more.

An example of the value of a com-



bined command is the PRINT PAGE key, which generates the string of characters necessary to send one page of the spreadsheet to the printer. Without this key, you would have to:

- move the cursor to the top left corner of the section you want to print;
- enter the Print command;
- enter any setup commands your printer requires;
- enter the lower-left coordinate of the section;
- press Return

PRINT PAGE accomplishes this whole routine with a single keystroke.

Another helpful feature of the VisiCalc overlay is the SCREEN PAGE SELECTION. By pressing a single key, you can go immediately to any screen page of the spreadsheet. You can select a special page for all input parameters of your model and another for the results. To enter the input parameters, select the Input Parameters page, enter the parameters, and then select the Main Results page to see the output before you print the whole spreadsheet.

You can redefine as many as 92 keys on the VisiCalc overlay. They can generate any combination of commands, up to 250 characters for each key. The VisiCalc overlay uses 227 keys for the different VisiCalc commands and the user-defined keys, plus 59 typewriter keys.

The principal benefit of the Keyport 717 to VisiCalc users is readily apparent: less time spent searching the reference manual. Another important advantage is faster program-response time. You get this speed advantage because execution takes place after a single keystroke instead of following the one or more menu displays and multiple keystrokes VisiCalc requires with a standard keyboard.

BY PRESSING A SINGLE KEY, YOU CAN GO IMMEDIATELY TO ANY SCREEN PAGE OF THE SPREADSHEET.

Down on The Farm

To hold a child's attention on a computer for more than a few minutes, you need a program written "at the child's level." The Keyport 717 application called The Farm succeeds by staking out new possibilities in educational programs, somewhere between drill-and-practice and Logo.

Once you boot, configure, and calibrate it, the program welcomes the child to interact with the colorful farm scene that appears over the upper portion of the keyboard overlay. Touching any figure in the picture produces a beep, and sends a low-res copy of the figure to the monitor screen.

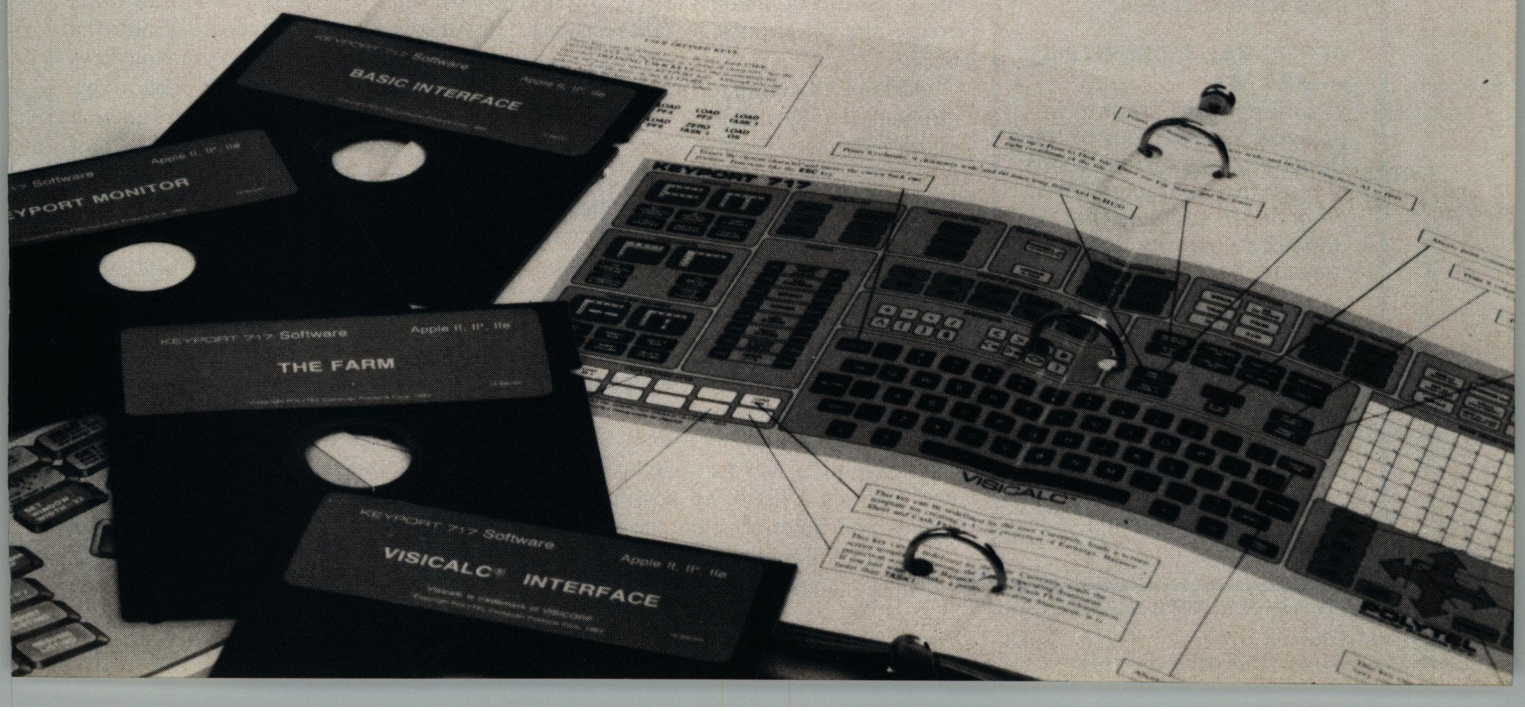
The opening game is called Tell Me. The child can select any of three questions to ask about the figure on the screen: "What does it say?" "What does it eat?" and "What does it do?" The answer to the question appears immediately on the screen for the child to read. Children are quick to notice that it is fun to touch, say, the henhouse and then ask, "What does it say?" The program's answers are straightforward and informative.

Four memory games follow Tell Me and offer four levels of difficulty. Watch and Touch involves remembering a series of farm characters flashed on the screen and then touching them in sequence. Watch and Type is similar but requires spelling the character names on the membrane keyboard.

A third game, Read and Touch, involves reading a series of character names from the screen and then touching the corresponding figures on the keyboard, in sequence. Last, Read and Type requires children to read the character names in sequence and then to type them into the keyboard, correctly spelled.

The program encourages right answers with Yea! and a musical fanfare and rewards a wrong answer with a Sorry and a sad little tune.

In addition to these games, The Farm offers a story-writing feature. By touching one of 21 preprogrammed word/phrase keys, children can, with a single keystroke, "key in" such story elements as IF I WERE, SOMETIMES, GALLOP, SAY, OVER, and BECAUSE. The story appears on-



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"The UltraTerm shines brightest in use with spreadsheets and word processors."

COMPUTER RETAILING —FEB. '84
"The UltraTerm is a high quality investment for anyone who has an Apple product and wants to add to it."

PEELINGS II—VOL. 4. NO. 8 '83
"The UltraTerm will be the new industry standard for Apple video display cards. The availability of the extra modes will enhance almost any software product that uses the text screen."

PERSONAL COMPUTING —MAY '83
"Perhaps the most impressive achievement of the UltraTerm expansion board is that the character set it produces is so sharp that its difficult to see the dots that make up each character."

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CIRCLE 141 ON READER SERVICE CARD

screen in 40-column uppercase letters.

Regrettably, the Apple's own keyboard is disabled during this function, and children must use the Keyport's membrane keyboard for character entry. Entering word after word to make a story becomes a tedious operation on a membrane keyboard, as opposed to the Apple's full-travel keyboard.

A child can elect to save the story, erase a story, get a story, display a list of stories, print the current story, print story titles, or print all stories. With skills such as these, a child can one day learn to write articles for computer magazines.

Design Your Own Program

Most interactive programs are either menu-driven or command-driven. In a menu-driven program, users tell the program what to do by choosing from a menu of functions. In a command-driven program, users learn the syntax of a command language, and type in the commands on the computer's keyboard.

BEGINNERS SHOULD GET GOOD RESULTS FROM A PROGRAM SOONER AND WITH LESS FRUSTRATION THAN WITH REGULAR PROGRAMS.

Menus require extensive programming, use lots of memory space, and increase the program's overall response time.

Although a command syntax is more efficient, it is harder to program. Command languages require users to spend time learning the language and then continually refer to the manual to check on spelling, punctuation, syntax, and other rules. Multiple keystrokes increase the possibility for error.

With the Keyport 717, you have an alternative to menu-driven and command-driven programs. You can design your own keyboard interface between the application and the user.

Designing a Keyport overlay begins with making a list of all possible commands and functions that the program or application may use. For example:

- Print Customer List
- Set Timer to Turn On Lights
- Load Balance Sheet
- Play Note C#
- Display Animation Sequence
- Paint Shape with Orange Color
- Display List of Files on Disk 2

To this list, you should add any frequently used combinations of commands. For example, TEXT:HOME:LIST is used frequently in BASIC to

1. change the screen from the Graphics to the Text mode;
2. clear the screen; and
3. list the BASIC program to the screen.

These three commands require 15 keystrokes on a normal alphanumeric keyboard. By replacing them with one key on the Keyport, you can save 14 strokes every time you list the program from the Graphics mode.

Next you should arrange commands according to a logical grouping and assign a function number to each group. For example, one group might contain all commands for changing the color of an object on the graphics screen.

Then you assign a Keyport key to each command or sequence of commands, choosing big keys for frequently used commands, to make them easier to find. You draw the keys directly on the clear Programmer Overlay that comes with the Keyport.

Using the Keyport utility software, you define each key by pressing the key you have drawn and entering its function number and commands. The Keyport utility creates a "key data block" for each key. The table of KDBs is called the "key definition table."

Finally, you link the key definition table to the program, using the Keyport utility software.

To run the program, fasten the overlay to the Keyport keyboard. Enter the commands and data by pressing keys on the Keyport. When you press a key, the key data block and its function number pass to the program. The program then branches directly to the appropriate subroutine.

The Keyport thus simplifies a programmer's job by eliminating both menus and command-syntax analysis. It also enhances copyright protection, since anyone who wants to run a given application needs the hardware and the software.

Users, on the other hand, benefit from the ability to run a program with little, or no, instruction—and without learning any typing commands. Beginners should get good results from a program sooner and with less frustration

than with regular programs.

Staking Out Markets

In choosing its first three program applications for the Keyport 717, Polytel has demonstrated the keyboard's versatility.

Additionally, it has staked out three sizable markets for its own growth: programming languages, off-the-shelf software packages, and games and education.

Not only is the Keyport a versatile tool with a limitless future, but by any measure, its price is reasonable.

Some will choose to pass it by, though. Touch typists may prefer to stick with the full-travel keyboard they're used to, particularly if they already know their program applications by heart.

THE KEYPORT IS A VERSATILE TOOL WITH A LIMITLESS FUTURE.

What matters most now, as the company tries to establish the Keyport as a sought-after microcomputer peripheral, is *application programs*. How fast can Polytel pump them out? What programs will they interface with? How good will they be?

Forthcoming program applications include a generic spreadsheet overlay (compatible with VisiCalc, Multiplan, and SuperCalc) and a word-processing overlay (WordStar). New educational programs include The Seashore and The Jungle.

As more application programs appear for this remarkable keyboard, you can expect it to show up in homes, labs, schools, and even in businesses. ✚

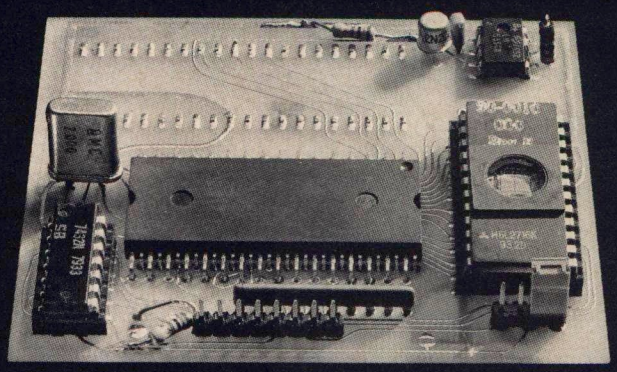
▸ PRODUCT INFORMATION

Keyport 717
Polytel Computer Products Corporation
2121 South Columbia
Tulsa OK 74114
(918) 744-9844

List Price: $179 (keyboard and cable, BASIC and auto-programmer overlays, utility disk); $39, VisiCalc overlay; $29, The Farm overlay

Requires: Apple II, II Plus, or IIe; 48K RAM; one 160-sector disk drive

QUENTIN



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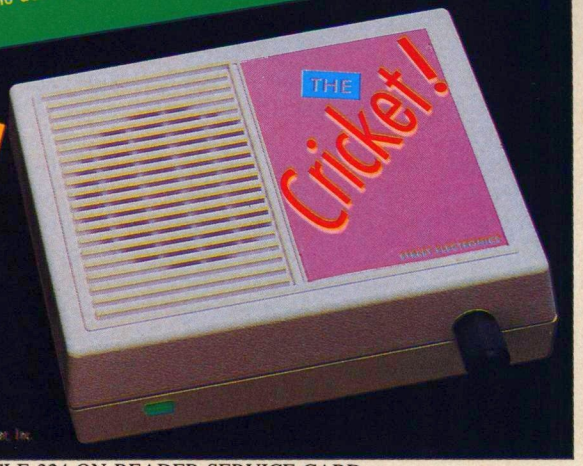

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THE CASE OF THE TRAVELING COMPUTER

TAKE YOUR APPLE WITH YOU ON THE ROAD.

If business trips are part of your job, then you know that travel is not romantic. You wait around in airports, consume rich food and hard drink, and sleep in hotel rooms that all look the same. What do you do in a strange city after business hours?

Thanks to a growing number of carrying-case manufacturers, you now have an alternative to TV, dissolution, or boredom. You can bring your desktop computer with you and compute!

People tell me, "Get one of those notebook-size portables and carry it in your briefcase."

They don't understand. I miss my Apple IIe when I'm away from home. I miss Apple Writer and Multiplan and Quick File, with 80 columns and 24 lines. I can't do real business computing without a full-size screen and my Apple. OK, OK—I also miss Alpine Encounter and Zaxxon.

But there's more to it than that.

The seclusion of a lonely hotel room is the perfect environment for productive computing—no interruptions, no phone calls, no distractions. How often do you get five uninterrupted hours of computing time at home or in the office? In that lonely hotel room, far from home, you can get those five free hours every night. You never had it so good.

Like the computers they carry, cases today come in a distracting variety of sizes, shapes, colors, and capabilities.

Dozens of manufacturers offer cases for microcomputers and for a wide variety of peripherals. Because every micro has its own size and shape, a plethora of cases is available. No matter which micro you favor, you can surely buy a case for it. If yours is an exotic brand or a homemade job with a unique shape, don't worry—many manufacturers offer custom fabrication.

You'll find a wide selection of cases for the more well known micros, such as the Apple II. Furthermore, you can safely order the case by name and be assured that it will fit.

Down to Specifics

Let's begin by disabusing certain Apple owners of the notion that their computer's original packing cartons make perfectly good carrying cases. Except for on occasional trips to Grandma's, during which you do not let the computer out of your sight, don't take packing cartons seriously.

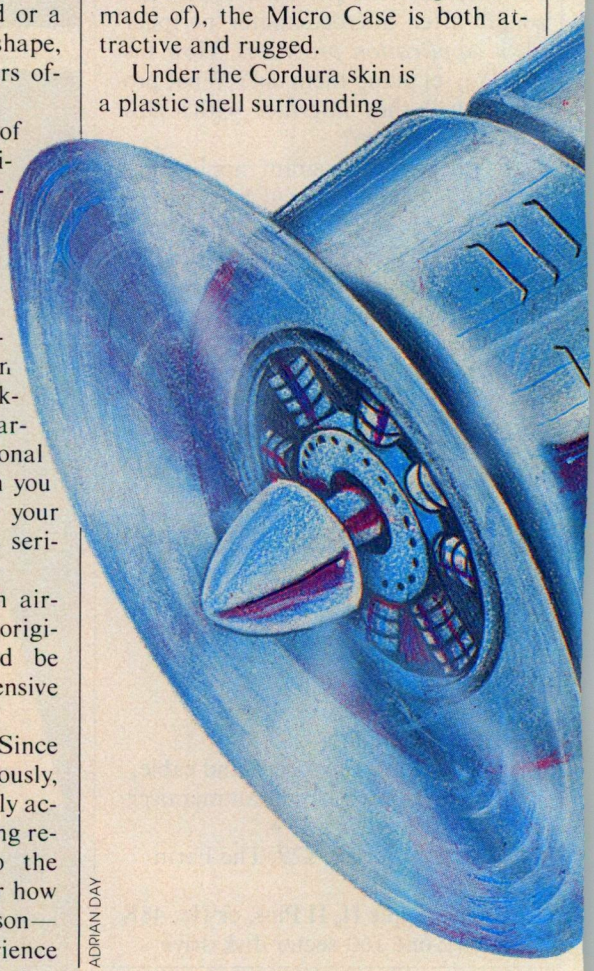
Don't even think of taking an airplane trip with your Apple in its original packing carton. You would be putting at risk a sensitive, expensive piece of electronics.

For one thing, it's not insured. Since the carton has been opened previously, the baggage check-in clerk will only accept it if you sign a waiver accepting responsibility for any damage to the contents of the carton—no matter how well it's packed. And for good reason—baggage handling is a rough experience for checked luggage. The villain isn't necessarily the man who slings your computer into the plane's baggage compartment—conveyor belts don't care if the box is marked *Fragile*.

Finding a case for an Apple computer is not difficult, but finding the right one for your requirements can be ticklish.

Soft-shell cases, for example, which enable you to "bag" your computer, are made to sling over your shoulder. One of the best of this type of carrying case is the Micro Case, from The Casemaker, San Jose, California. Featuring a colorfully designed exterior of Cordura (the same fabric that many tents, backpacks, and bad-weather gear are made of), the Micro Case is both attractive and rugged.

Under the Cordura skin is a plastic shell surrounding



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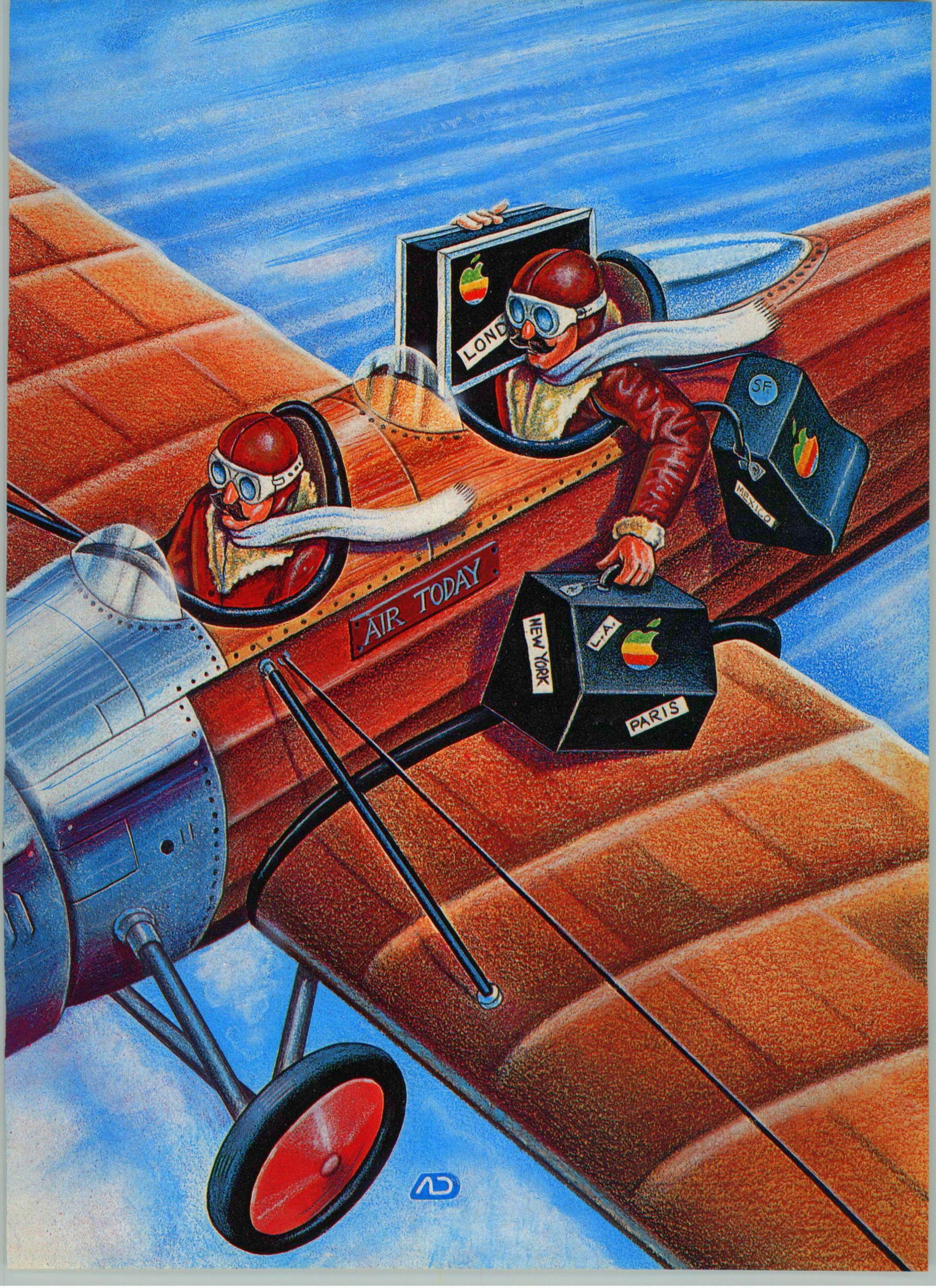
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five inches of dense die-cut foam. The Apple Micro Case holds an Apple II, II Plus, or IIe; two disk drives (which can be left attached to the computer); a Silentype printer, or software and manuals; and cords.

Hard, Hollow, and Cheap

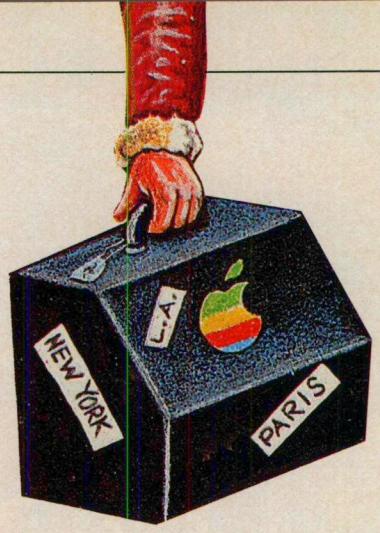
Although soft-shell cases are all right for carrying your Apple from office to car, you probably need something stronger for longer trips.

Hard-shell cases come in two types—carrying cases and shipping cases. Hard-shell-case manufacturers have something for everybody. They make cases of thermoformed plastic or rigid polyethylene, aluminum, vinyl-coated plywood, fiberglass, or mahogany, which feature recessed locks, foam cushioning, tempered closure rims, steel corners, and double walls. Cases are available with straps, on wheels, and with interlocking outer surfaces, and they come in a variety of colors, plus custom screen-printed art work.

Fiberbilt (Ikelheimer-Ernst), of New York City, makes a complete line of hard-shell cases, including model 18164 for the Apple II. This black, noninsulated case holds the computer and two disk drives and features a cover, which you can remove, leaving the computer still fastened to the case bottom. When the job is done, you snap the cover over the Apple, and away you go!

Micros on Wheels

If you really want to travel with your micro—and turn your precious, irreplaceable equipment over to the care of airport baggage handlers, conveyor belts, and other uncertainties—you need a special kind of case. You need a case that's hard on the outside and soft on the inside.



If you really want to travel with your micro, you need a special kind of case.

Parsons Manufacturing Corporation, of Menlo Park, California, offers a variety of higher-end cases for the micro-toting traveler. Molded exterior surfaces resemble durable luggage; interiors are packed with foam cut to fit around sensitive electrical equipment.

If you've ever lugged heavy baggage through an airport terminal (why do you think they call it *luggage*), then you'll appreciate the recessed wheels that appear on many of Parsons' cases. Wheel sets pop out from beneath the cases, and handles pop out from the top—turning an otherwise heavy case into a rolling cart.

The Apple II case I reviewed for this article—model 2321 HTRS—features locks recessed into 3-inch-wide, reinforced, tempered closure rims.

Mention luggage, and the name American Tourister comes to mind—you know, the company that hires gorillas to jump on its suitcases. This firm put the "tradition" into "traditional luggage." It's now coming out with a line of computer cases, starting with an Apple II case that looks like a suitcase.

Constructed of high-impact-resistant ABS plastic and lined with die-cut polyurethane foam, the Apple II case resembles a sleek, ordinary suitcase and bears its delicate contents with maximum cushioning. Unique swivel-action closures and patented key-type locks supplement a 3-digit combination lock. Additional features include a stainless-steel frame, padded handle, and built-in T-bar handle and wheel set.

American Tourister courteously points out that its case, although rugged and sturdy, is not a substitute for a proper shipping container—good advice. The firm states that it does not recommend that its cases be checked as luggage on an airline. Other case manufacturers could follow suit.

Saving the Best for Last

One more case deserves mention here—a case made especially for those who do more than carry their micro between home and the office.

▶ CASE MANUFACTURERS

Company	Model	Case Type	Price	*Card #
American Tourister	0902D	Hard-Shell	$149.95	450
Anvil Cases	CPA-II-31A	Hard-Shell	$323.00	451
Cases, Inc.	C101	Foam-Lined	$110.00	452
Cases, Inc.	F110	Hard-Shell	$250.00	453
Computer Case Company	AT102	Hard-Shell	$119.00	454
Computer Case Company	AT103	Hard-Shell	$129.00	455
Computer-Mate	G15003	Hard-Shell	$304.00	456
Ikelheimer-Ernst	17627-20	Hard-Shell	$208.50	457
Ikelheimer-Ernst	18041	Hard-Shell	$206.00	458
Ikelheimer-Ernst	17627-30	Light-Duty	$135.00	459
Ikelheimer-Ernst	18164	Light-Duty	$65.00	460
P.C.A.	L-81H	Hard-Shell	$109.90	461
P.C.A.	L-71	Soft	$59.90	462
Parsons Manufacturing	PC-1001	Hard-Shell	$205.00	463
The Casemaker	Apple Case	Hard-Shell	$129.00	464
The Madson Line	AppleII	Foam-Lined	$135.00	465

*Circle the corresponding number on the Reader Service Card in this issue.

I've "road-tested" this case—from Cases, Inc., Seattle, Washington—through airports, in and out of taxicabs and buses, and through the hands of numerous porters. The case has withstood every test, and my Apple IIe has never gotten a scratch. Other cases may be as good, but none is better.

Cases, Inc., brings 17 years of experience making hard-shell guitar cases to the task of protecting delicate computer hardware from the hazards of travel or shipping. The company produces both a carrying case and a shipping case. My top-of-the-line Flight Form case is manufacturered of high-impact ABS plastic laminated to plywood.

The edges of this case are extruded aluminum tracking with riveted steel corners for structural integrity. If a side somehow gets broken or punctured, Cases, Inc. will replace it at the factory.

Interiors are designed for maximum shock absorption and feature form-fitted urethane foam liners. The cases are available in white, black, or royal blue, and special clasps confirm the quality workmanship that has gone into them. The shipping case for my Apple II, with its two disk drives, lists at $250. A less-expensive series of carrying cases from this company starts at around $120.

Don't Forget These Items

So there you are, in your hotel room, far from home and the office. You unpack and start to set up your computer—you're looking forward to some intense computing—when you suddenly discover it won't work! Your micro has a 3-prong plug, and the hotel offers only 2-prong electrical outlets. Next time, bring an adapter.

Another scenario for a "bad trip" has you merrily computing away, when suddenly a power surge occurs in the hotel's antiquated electrical wiring, spiking your machine and costing you data. Next trip, remember to bring a surge protector.

Packing It All In

Nothing can beat a good set of tools—your Apple computer and its peripherals—for doing quality work. With these tools, and your talent, all you need is time. Since business travel often offers an abundance of free time, the executive who plans ahead can profit handsomely from it.

The variety of available computer cases is extensive, with one for every budget and every traveling situation. You don't have to leave your computing tools at home when you travel. Pack them up and take them along. ✚

You've seen what I can do during the day, You should see what I can do at night.

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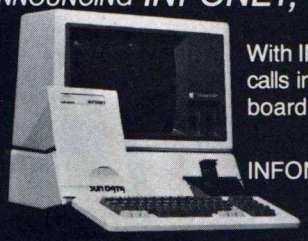

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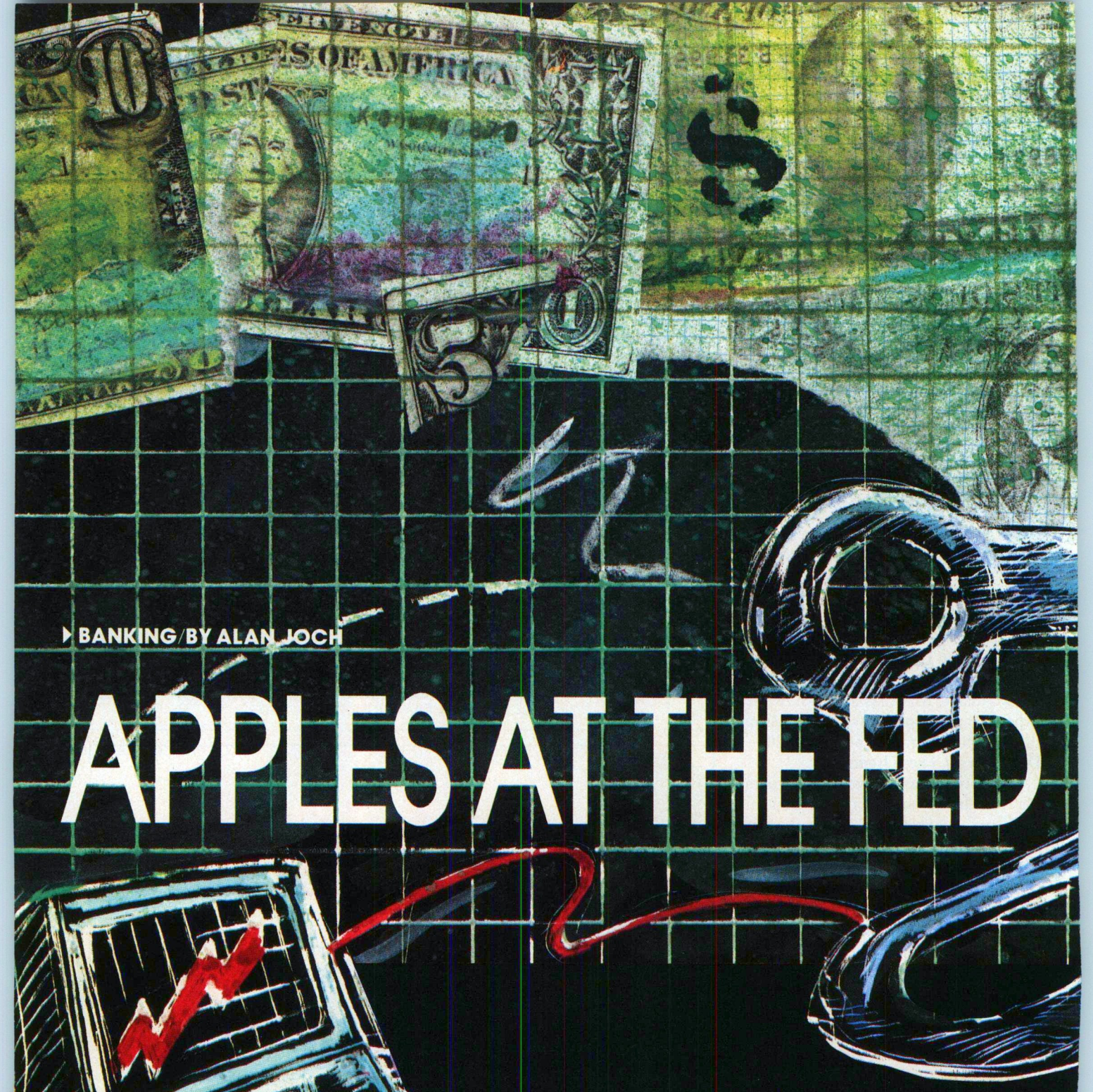
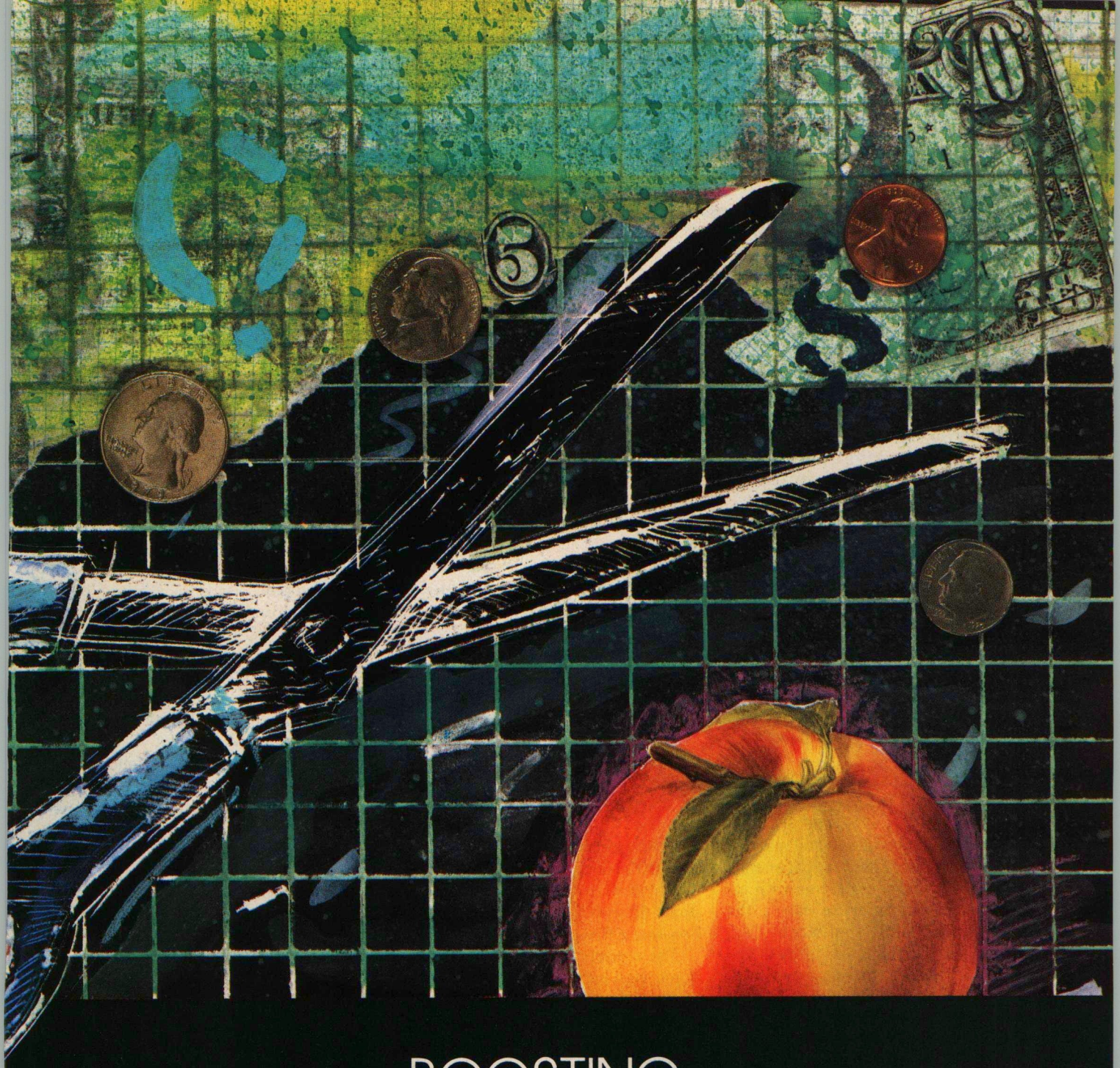


BANKING/BY ALAN JOCH

APPLES AT THE FED

The research department of the Federal Reserve Bank of Atlanta was foundering in 1981. As one of 12 regional banks in the Reserve system, Atlanta's bank provided analysis of grass-roots and national economic trends to help the Fed's policymakers in Washington determine the level of the nation's money supply and interest rates. The economy slumped into a recession that year, and interest rates rose to an all-time high, but the Atlanta bank's researchers remained anchored in the past. William Cox, associate research director and veteran of that period, recalls, "This de-



BOOSTING RESEARCH EFFICIENCY EQUALS CUTTING COSTS IN THE PEACH STATE.

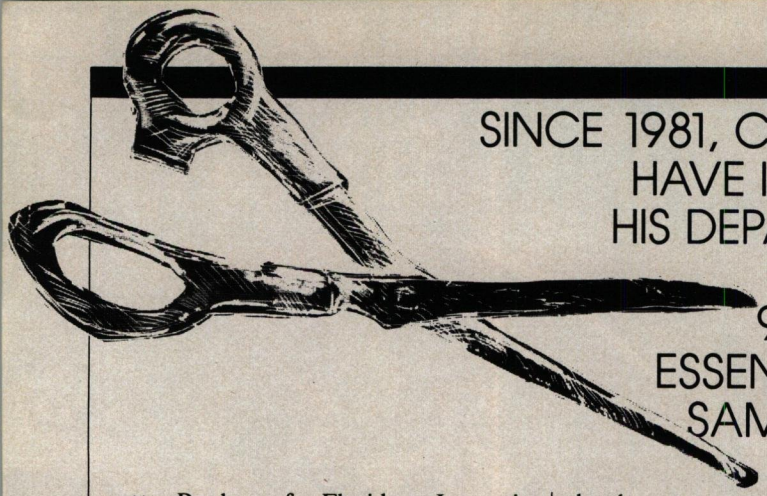
partment was run in a way analogous to charting a ship's course by sitting below deck and studying the captain's log."

When the department decided to modernize, it signed on Donald Koch, a Florida banking executive with a sea captain's swagger, who came aboard with a duffel of Apples and floppy disks. Three years later, the Apples have not only boosted the research staff's output of economic information, but they have also helped its economists gain a reputation for progressiveness and innovation. "We're now like a sailor on deck, keeping watch," Cox observes.

According to Koch, now senior vice-president and research director, the research department modernized successfully because it combined the use of computers with a change in the "culture" of the office. "We convinced the people here that it was in their own best interest to make this department not only the best research shop in the Southeast, but also the best in the entire reserve system."

Koch based his approach on his experience as an executive officer of Bar-

YVONNE BUCHANNAN



SINCE 1981, COMPUTERS HAVE INCREASED HIS DEPARTMENT'S OUTPUT 920% WITH ESSENTIALLY THE SAME BUDGET.

nett Banks of Florida, Inc., in Jacksonville, where he supervised the economics staff and began applying computers to banking operations. At Barnett Banks, he was part of an office environment that emphasized flexibility rather than rigid work rules.

Often, in the middle of the night, Koch finds himself at a computer terminal, working out a software program that has come to him in his sleep. He reasons, therefore, that his staff of 56 people can best perform their duties if they're free to determine their own work hours and, to some degree, their responsibilities. "We hire their minds, not their bodies," he maintains, adding that computers are an essential tool for office flexibility.

Entrepreneurial Energy

At the heart of the new organization are 23 Apple II, II Plus, and III computers for word processing and statistical analysis. The department's economists formed into teams with individual areas of expertise during the same period in 1981 that Koch, Cox, and Delores Steinhauser formed the electronic data-gathering network. (Steinhauser, an economic analyst with Barnett Banks, had joined the Atlanta bank to guide database development.)

The trio made hardware and software choices after asking staff members about individual needs. "We're not using computers because some expert told us they would make our life easier; we use them because they fill a need," Cox emphasizes. He calls this attitude an "applications driven" approach to computers.

This philosophy has produced a network of economists—all of them with their own computer—and an asynchronous communications link that connects Apples to dedicated word processors, printers, and desktop graphics terminals.

The research department chose Apples because they provided word processing, an electronic spreadsheet, and database management. "We also wanted to buy from a company that would be around for a while," Cox adds. "And we figured Apple would."

Koch compares the group's methodical evaluation of Apple to the activity of investors who contemplate buying stock in a company. Koch visited Apple headquarters and met with Apple founder Steve Jobs. "I was impressed by the dedication and commitment to excellence I perceived at Apple," Koch recalls. After considering other microcomputer makers, including "the highly bureaucratic IBM," he decided to "bet on the entrepreneurial energy and spirit of Apple."

Despite "being on the slow side" compared to some competitors, the Apple computers are integral components in the research department. Apples continue to outnumber other brands that have been added since 1981, even though the department wants to remain independent from Apple or any other single producer.

Boosting Efficiency 920%

The department flexes its new electronic muscle primarily in the *Economic Review*, an advertising-free journal with more than 30,000 readers. With 60 to 70 pages each month, the *Review* has doubled in size and frequency since 1981. The research staff generates approximately 80 articles per year on subjects ranging from regional economics to deregulation in the commercial banking industry. Recently the staff added a new publication to the fold, a twice-monthly newsletter called *Southeastern Economic Insight*, which provides 6000 subscribers with current regional news.

Koch estimates that since 1981, computers have increased his department's output 920% with essentially the same budget and staff.

The staff also prepares an internal briefing book every six weeks when the bank's president sits on the Federal Open Market Committee, the policy-making arm of the Federal Reserve. "It's our job to provide the president with an analysis of the general economy, current issues, and the grass-roots status of our region," Cox explains. "And Apples play a part in all of that."

Forecasting Profits

The primary Apple applications are "nothing dramatic, just convenient," according to Dr. Gene Sullivan, the research officer of the regional economics team. Sullivan runs an Apple III equipped with an Apple printer. Using PFS:File, he gathers economic data from telephone surveys throughout the bank's six-state district. During the telephone interviews, he enters data directly to the on-screen questionnaire, and the program immediately categorizes the information according to location and industry. Data retrieval in the former "yellow legal pad" days involved sifting through reams of handwritten notes. "Now, if I want to see construction trends in Birmingham," Koch reports, "I call that up on the computer, and the data appears on the screen."

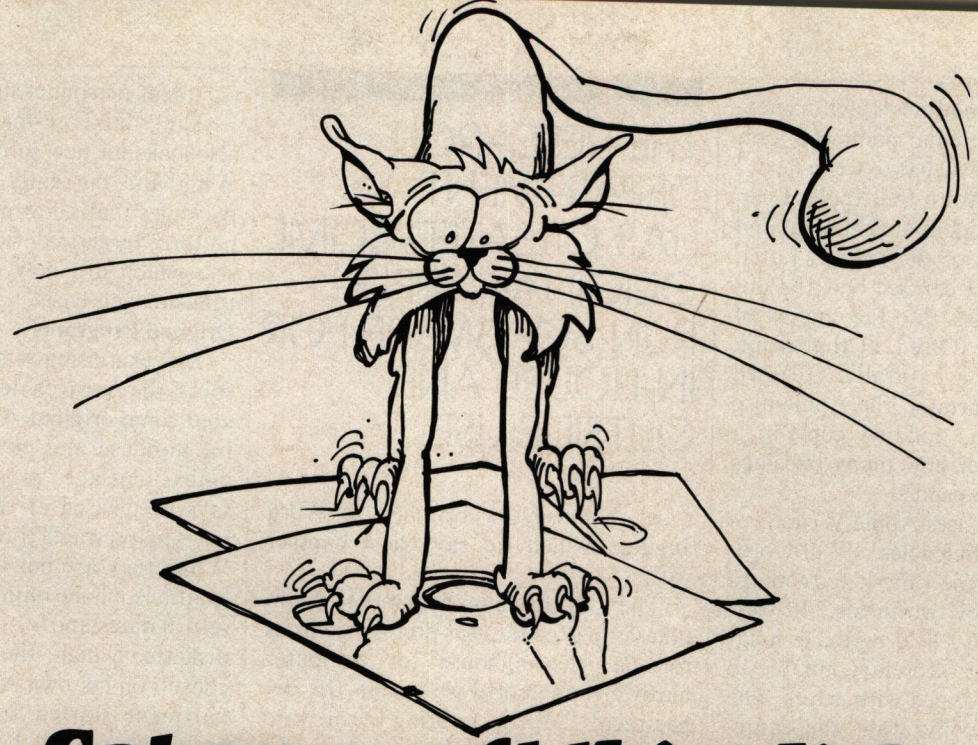
For other forecasts, Sullivan, an agricultural economist, uses VisiCalc to track the ongoing health of specific crops during the growing season in order to forecast yield, prices, and profits. "I can enter total acreage planted for a crop and multiply that by yield-per-acre projections to estimate the year's production," he explains.

Another column holds the latest prices, which he applies to the production figures to forecast gross revenue. "I then subtract fixed and variable costs from another column to determine net return. Once I have this information for every state in our region, I can get a pretty good clue to that year's income."

Even in years of drought—such as 1983—when nature's volatility produced almost daily changes in crop forecasts, Sullivan could produce recalculations across the range of the spreadsheet by pressing a single key, rather than by spending hours in laborious longhand adjustments.

Solving Mental Blocks

Similarly, Dr. Larry Wall, an economist in the financial-structure team, relies on an Apple III to generate articles ranging from financial-services deregulation to evaluations of reform proposals in deposit-insurance agencies. He'll write six articles for the *Economic Review* this year using Word Juggler, a word-processing program he believes increases his writing efficiency by almost 100%. "When I used to write



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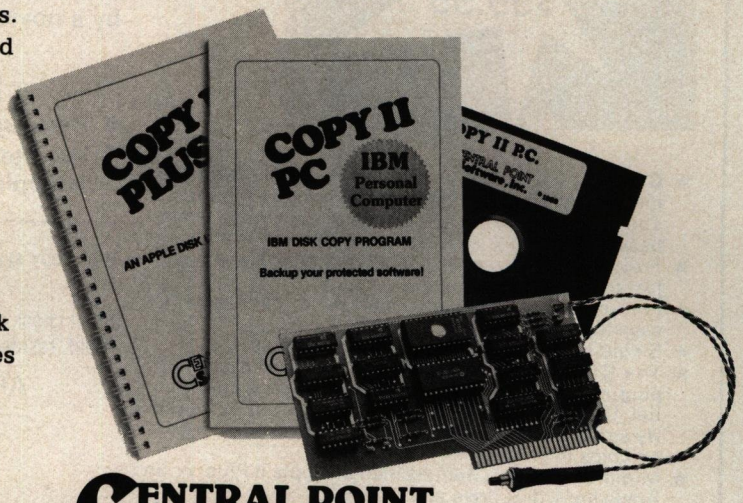

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CIRCLE 184 ON READER SERVICE CARD

longhand, I'd sometimes reach a mental block at a particular point and for a long time not know what to write next," he remembers. "With the Apple, I can rough-sketch my ideas at that point and go on to the rest of the article. Later, when I go back, I can see how the unfinished section fits into the context of the entire article. Often, at that point, the words just flow naturally." Teamed with a deskside printer, the Apple also provides a clean, updated copy in a minute, no matter how many revisions of the article are needed.

Sullivan, who uses Apple Writer, reports similar efficiencies. "Word processing reduced the time it took me to write an article by two-thirds," he estimates. Previously, he'd write a longhand draft that a secretary, unable to read his writing, typed with errors. The second, revised copy, was "the equivalent to what I get when I do it myself on the Apple," he says.

The department's secretaries are delighted to find their roles expanding to include research duties, thanks to the reduction of the typing load.

Most of the department's economists use Apple Writer. When Wall found the deletion function and the cursor movement of that package awkward, however, he switched to Word Juggler, which he says he's happier with.

THE RESEARCH DEPARTMENT HAS CREATED SOME ORIGINAL APPLE-RUN SOFTWARE FOR IN-HOUSE AND OUTSIDE USE.

The database-management team takes into account user preference in its role as clearinghouse for computer hardware and software within the department. "We try to bring in software that helps people do their jobs better," says Pamela Whigham, a team member along with Delores Steinhauser. "With popular packages such as Apple Writer and VisiCalc, we try to provide one for each person who has an Apple." For software with more specialized applications that aren't needed on a day-to-day basis, Whigham maintains a software library of 20 packages that department personnel sign out as needed.

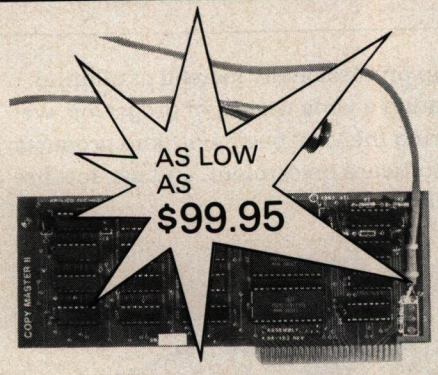
The database-management team also looks for new software innovations. Whigham currently is investigating packages that allow microcomputers to perform large-scale econometric analyses, which are now done on a costly time-sharing basis.

Original Programs

By exercising its entrepreneurial spirit, the research department has created some original Apple-run software for in-house and outside use. A computer message program—one Koch says he devised at three in the morning—helps track traveling economists. While they are out of the office, their locations, phone numbers, and expected return dates and/or times are held on a diskette, which the receptionist can consult on her own Apple. Since the department started using the program early last year, it has saved time and frustration in determining employees' whereabouts. Says Koch, "That $1500 Apple paid for itself in the first week we used it."

"What If" Capabilities

In a similar burst of creativity, Cox customized VisiCalc to produce an experimental cost-analysis program that could help commercial banks chart



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their own financial health. Known as FCA 84, the Apple-compatible diskette program is a computerized modification of the Federal Reserve's Functional Cost Analysis program, an elaborate, 20-year-old bank-profitability-charting system that often takes a full-time employee three months to complete. Because it can highlight a bank's cost of doing business, banks greeted the FCA #84 as "a beautiful product when it was introduced in the 1960s," says Cox. But as the banking industry changed, FCA's slowness "made it a turkey for the 80s," he adds.

His alternative, written with the help of Joel Parker—a coleader of the administrative team—helps users pinpoint profits on a daily basis. "There are probably tens of thousands of bankers who know the old FCA system, but why should they beat their brains out to get an analysis that's already outdated? With this one, seconds after you complete your input, you have the results," Cox claims.

The Atlanta Federal Reserve Bank is offering the test program to its commercial bank members who want to be "weaned" off the old system. Many are interested in it not only to gauge profits, but also to make the best use of their Apples. Cox believes that the program's ability to update data on a continuing basis may also lead to important new computer applications for commercial banks. "The 'what if' capabilities of this program relate to day-to-day needs. The banks that survive are going to need this type of analysis."

COMPUTERS ARE HELPING THE BANK TO MAINTAIN ITS VIABILITY AS AN INFORMATION OUTLET.

Performance Contracts

Although survival isn't dependent on profits at the government-backed Federal Reserve Bank of Atlanta, computers are helping the bank maintain its viability as an information outlet. Koch's approach allows the staff the flexibility to determine work hours or occasionally to work at home. Staff members are also encouraged to pursue both professional and personal goals during normal business hours. Koch evaluates these goals through annual performance contracts. In one case, a scholarly, but painfully shy, staff member spent a portion of his workday attending a personality-improvement course. Staff members may pursue advanced studies or spend a morning playing tennis, as long as they abide by their contract goals. "We're results-driven, not activity-driven," reasons Koch.

Initially, this approach met with skepticism when Koch, the "outsider," proposed it in 1981. Although most of the staff value the freedom, some concede that the crush of business- and work-related activities—such as attending meetings—often make stay-at-home options difficult to capitalize on.

Dr. Wall and others caution that a flexible office environment needs more than just a philosophical commitment to succeed. "You can have performance agreements and this general atmosphere, but with inefficient tools, you wouldn't be able to get the same results," he concludes. "Computers are the tools that have made us more efficient." +

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Ten New DOS Commands

1. **TLOAD speed loads all Text Files, random or sequential, to ram.**
2. **TSAVE speed saves all Text Files, random or sequential, from ram.**
3. **TLIST Lists all Text Files, random or sequential to screen/printer.**
4. **DUMP Memory to screen/printer in Hex with Ascii on right side.**
5. **DISA disassembles Binary to screen or printer.**
6. **AL prints last loaded program Address & Length in decimal & hex.**
7. **HIDOS moves DOS to Language Card & continues operation of program.**
8. **/ is a one keystroke Catalog in addition to the original command.**
9. **DATE prints with any clock. Also File Dating with clock or manual.**
10. **FIND prints address's of hex found in 64k memory. Hidos cmd only.**

Compatible

All DOS entry addresses have been preserved. DOS is original length and compatible with most software. David-Dos II is copyable and creates fully copyable updated disks. DAVID-DOS II is licensed by programmers for inclusion in the software they sell. Init areas were used for David-Dos II. Works with all Apple IIs including IIe 80 Col, Franklin & Hard Disks, such as Corvus & Xebec. Requires 48K. Complete documentation for screen or printing and many utilities are on the disk.

All times in seconds. (Time Test programs available)		DAVID DOS-II	ProDOS	DIVERSI DOS	DOS 3.3
TEXTFILES (100 Sectors)	TSAVE	8.0	NO	NO	NO
	TLOAD	6.2	NO	NO	NO
(791 Strings, 32 chars ea)	WRITE	29.3	28.0	29.4	88.4
	READ	24.3	16.3	24.3	83.8
	PRINT/READ	44.2	45.9	45.1	117.1
(442 Sectors, 7 x 5'00)	APPEND	142.3	142.9	151.1	1231.2
APPLESOFT (100 Sectors)	*SAVE	6.4	16.4	6.4	33.1
	LOAD	5.0	4.0	5.0	23.5
INTEGER (100 Sectors)	*SAVE	6.6	NO	6.6	33.4
	LOAD	4.9	NO	4.9	23.4
BINARY (100 Sectors)	*BSAVE	7.3	18.4	7.3	28.7
	BLOAD	5.8	4.8	5.8	24.5
48K PROGRAM SPACE (With 3 Bufs avail)	APPLESOFT	36,352	NO	36,352	36,352
	INTEGER	36,352	NO	36,352	36,352
	BINARY	36,352	34,816	36,352	36,352
64K PROGRAM SPACE (With 5 Bufs avail)	APPLESOFT	46,592	31,232	45,658	35,162
	INTEGER	46,592	NO	35,162	35,162
	BINARY	46,592	40,704	45,658	35,162
NUMBER OF DOS COMMANDS		37	29	31	28
CLOCK FILE DATING		YES	YES	NO	NO
MANUAL FILE DATING		YES	NO	NO	NO
ONE KEYSTROKE CATALOG		YES	NO	YES	NO
AUTO USE INTEGER CARD ANY SLOT		YES	NO	NO	NO

Each Program was tested twice W/Apple Clock Card on a newly formatted disk containing DOS.
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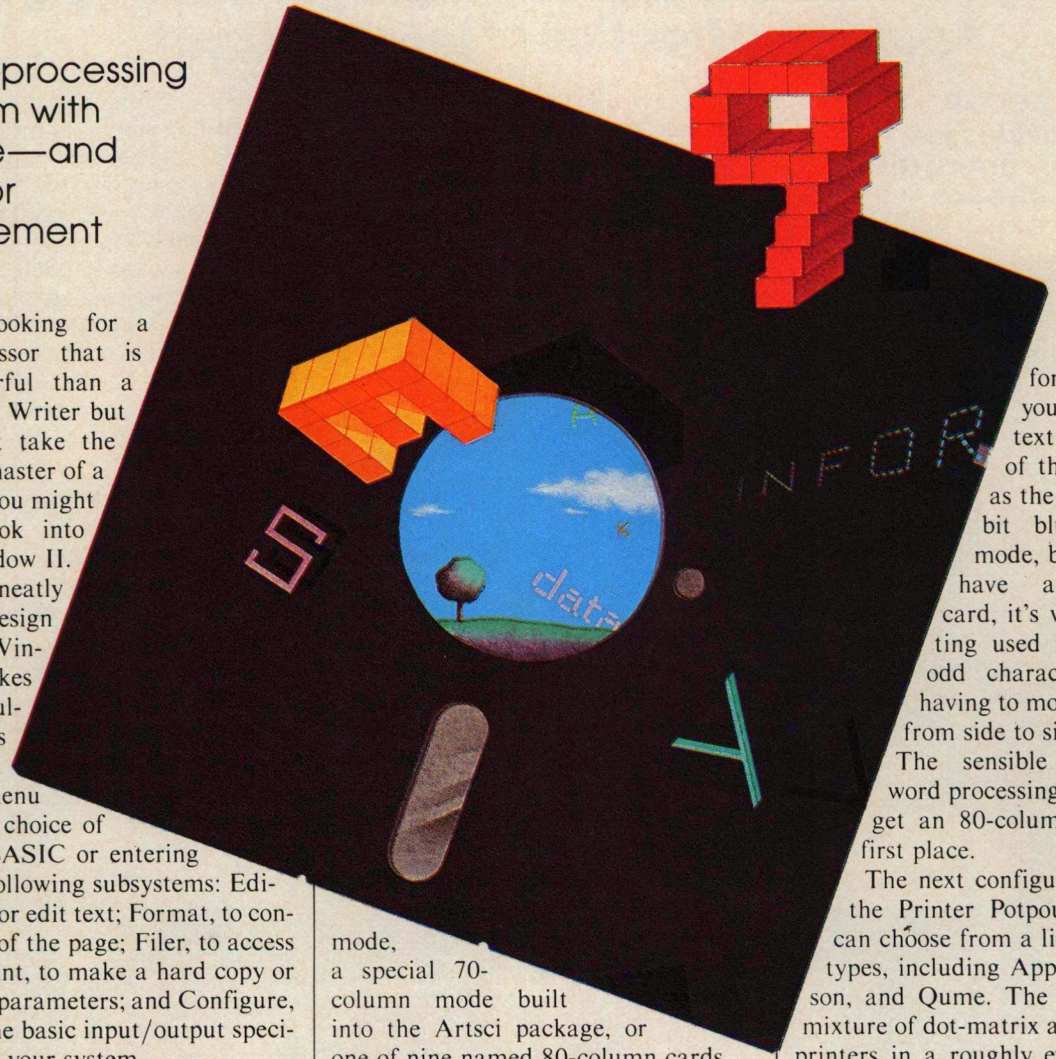
▸ SOFTWARE REVIEW/BY DOROTHY L. STARK

MAGIC WINDOW II

A word-processing program with promise—and room for improvement



If you're looking for a word processor that is more powerful than a Bank Street Writer but that doesn't take the months to master of a WordStar, you might want to look into Magic Window II.

Artsci's neatly arranged design for Magic Window II makes using its multiple menus convenient. The main menu gives you a choice of exiting to BASIC or entering one of the following subsystems: Editor, to enter or edit text; Format, to control display of the page; Filer, to access the disk; Print, to make a hard copy or set printing parameters; and Configure, to change the basic input/output specifications for your system.

Configuring Your System

Before you reach the main menu and leap into the editor for the first time, you must go through a brief initial configuration process. Although this may sound ominous, you won't have to answer any technical questions.

On the driver diskette, the first menu, Video Variety, gives you a choice of using the standard Apple 40-column mode, a special 70-column mode built into the Artsci package, or one of nine named 80-column cards (including an option for an unlisted one). If you choose the 40-column mode, you can see only half of your text at a time; to see the other half of each line, you must scroll horizontally by using the arrow keys. The 70-column mode reduces the memory available for text (ordinarily 103 sectors per file, about 1⅓ times the length of this article) but gives you an alternate screen font that allows you to see all your text at once. Some of the letters, such as the *n* and *w*, are a bit blurred in this mode, but if you don't have an 80-column card, it's well worth getting used to the slightly odd characters to avoid having to move a "window" from side to side continually. The sensible approach to word processing, however, is to get an 80-column card in the first place.

The next configuration menu is the Printer Potpourri. Here you can choose from a list of 11 printer types, including Apple, Diablo, Epson, and Qume. The list includes a mixture of dot-matrix and daisy-wheel printers in a roughly even division of parallel and serial types.

You select the unlisted-printer option if your model is not on the list. The printer will then receive codes that are compatible with most "plain vanilla" printers, which lack such functions as subscripts, superscripts, boldface, expanded width, alternate character fonts, and the like. Inexperienced users of this version of Magic Window II

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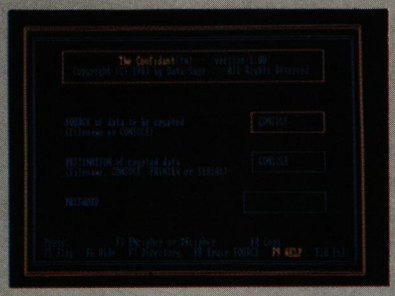

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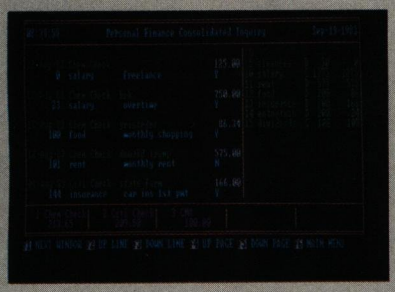

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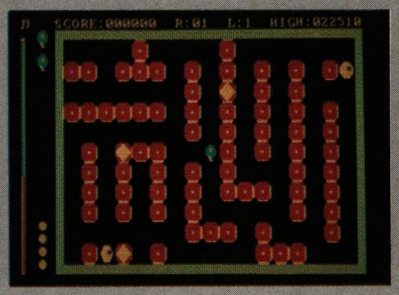

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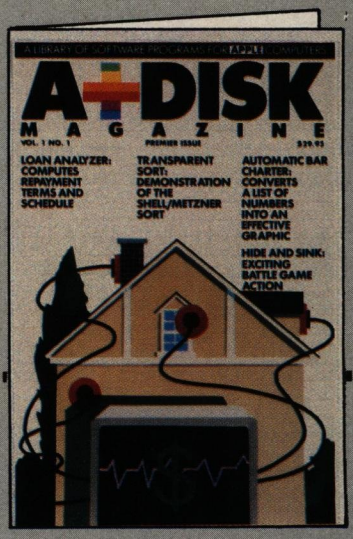

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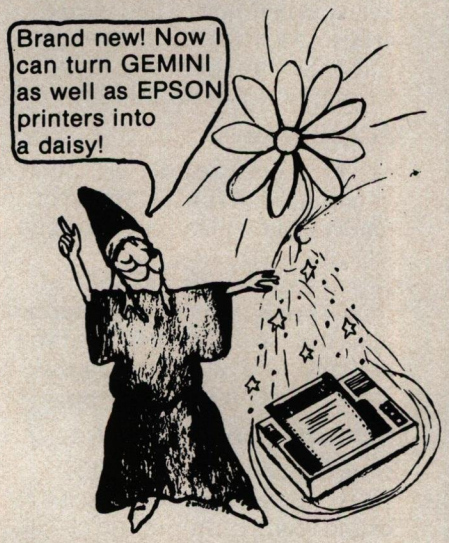

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won't be able to configure an unlisted printer to provide these advanced features—the manual does not even suggest that such configuration is feasible, although when I called Artsci I found that its technical-support people were able to help in this matter. In an upcoming version of Magic Window II the manual will discuss what you need to know to set up an unlisted printer.

The next configuration question asks which slot the printer card uses, and you must answer a question about your Apple's ability to produce uppercase and lowercase letters. If you are using an Apple II or II Plus without an uppercase/lowercase adapter, all text will appear as uppercase on the screen, although the printer will receive it as all lowercase. On these machines, you can generate a true uppercase letter that will appear in reverse video by using the Escape key. Of course, Apple IIe users can type normally because of that computer's uppercase/lowercase capabilities.

The format you see on the screen is what will appear on paper.

When you have answered all the configuration questions, you make a "slave" driver diskette that includes your specifications. This disk will usually also hold text files, especially if you have only one disk drive. If you have a second drive, you can store files on a disk other than the one that contains the Magic Window II program itself.

You need to go through the configuration process only once, unless you change your system components. If, for some reason, you do need to reconfigure, you can update your slave disk without damaging any text files that may be on it.

To begin using Magic Window II, you boot up the master diskette. The program redundantly asks you—I don't know why—if you want 40/80 columns or 40/70/80 columns. Then you slip in your slave disk and press Return. The main menu appears, and you're ready to go.

The Edit Subsystem

With Magic Window II, you will be using the Edit subsystem nearly all the time. When you type in text, whole words automatically wrap to the following line when they do not fit on the current line. You never have to press the Return key except to begin a new paragraph.

Word processors "wake up" either in the Insert mode or in the Overwrite mode. In the Insert mode, any text you type in the middle of a full line will push the words after it forward, wrapping them onto the next line if necessary. In the Overwrite mode, you type over characters already on the screen; the new letters erase and replace the old ones.

Magic Window II uses a unique combination of these two styles. When the cursor is in a line of text with words on both sides of it, you are in the Overwrite mode. When the cursor is beyond all the words on a line, though, the program automatically switches into the Insert mode, which continues until you press Return or another cursor-movement key. This blending of modes may seem confusing at first, but, practically, it is convenient when you become familiar with it.

How the Screen Appears

In the Edit mode, the top line displays the name of the file, the page, the line, and the cursor column. In the lower left corner, the number of remaining free sectors appears, leaving 21 lines of actual text on the screen. A horizontal line the length of the specified line shows you where one page ends and the next begins. I found this feature especially helpful for positioning footnotes and seeing how much room was available at the bottom of a page for a diagram. At the top of the page, Magic Window II allows you to set up a one-line "header" containing a page number and other information that will appear on every page. The program doesn't provide for a similar "footer," however. The rest of the page is free for text entry. The format you see on the screen (including single- and double-spacing) is what will appear on paper.

Except for overwriting, you do all editing by using control codes. Magic Window's paging system gives you a quick and helpful way to flip through your file. With Control-P followed by a page number, you can "home the cursor" (move it to the upper left corner of a page). By using Control-P and the left- or right-arrow key, you can skip forward or backward one page at a time.

You control cursor movement with a series of sensibly arranged codes on the left side of the keyboard. You move up one line with Control-Q, down one line with Control-Z, up ten lines with Control-W, down ten lines with Control-X,

to the top of the file with Control-E, and to the end of the file with Control-C. To move left and right, you use two less strategically placed key codes, Control-H and Control-U, or, more often, the left- and right-arrow keys. Other control sequences allow you to set tabs.

Manipulating Text

The ability to delete unwanted portions of text is one of the most important parts of any word-processing package, and Magic Window II makes the process easy. To delete one character at a time, Control-D is simple to remember (although the unused Delete key would seem more natural). Control-L deletes to the end of a line, and Control-K "kills" an entire line. The only unfortunate part of this system's Delete function is that it lacks a control code for deleting an entire block of text. This omission is only a minor nuisance, however, because holding down Control-K until a whole paragraph disappears is easy enough.

To insert or "fill in" a character, you can use Control-F, and to add a blank line, you need only press Control-I (for *insert*). To enter more than a single letter or line in the middle of text, you switch to the Insert mode. Control-T (for *turnover*) allows you to launch into the Insert mode in the middle of a line.

At times, you will want to move whole blocks of text from one part of a file to another. Using Magic Window II, you can "pick up" lines with Control-O and "recover" them later with Control-R. The buffer in which the blocked text remains temporarily can contain only 16 lines, however. Further, you must use Control-O separately on each line you want to move. This is a clumsy method of transferring blocks of text to different postions within the same file, but it is adequate if you do not need to move large chunks of text often. One positive feature of Control-R is that it also allows you to recover lines that you have just accidentally erased.

You must use Control-O separately on each line you want to move.

Control-J gives you justification, or alignment of the text with the margins. You can justify the left or right margin or the center, make both edges even by having the computer add extra spaces, or condense lines by eliminating extra spaces. Magic Window II justifies only with full spaces, not with the microjustification that some specialty printers can produce. Justification of both margins results in neat-looking text, but you must be careful about the lines that end paragraphs. In this program, two or three words will stretch to cover an entire line unless you go back and condense these particular lines.

You can also "glue" whole lines together, which means making as many words as possible fit on a line without justification. This function, found in many word-processing systems of the on-screen-format ("what you see is what you get") type, is necessary after insertions or deletions. You can choose to make Control-G automatically glue together entire paragraphs rather than single lines.

Bugs in Search/Replace

The Search/Replace function is a tool you'll find in all but the least-expensive word-processing systems. Its most common uses are changing names in form letters, correcting repeated misspellings of a word, and generally replacing some or all of one word or phrase with another. The Search function works normally, but the Replace part in this package has some serious bugs.

Magic Window II does not differentiate (even on the IIe) between uppercase and lowercase letters when searching or replacing. For some reason, in this program, the format of what you are *replacing* determines the format of the substituted word or phrase. This system makes it difficult to use the function with multiword replacements. You cannot, for example, substitute the proper name of a corporation in place of the word *company* in a form letter because of uppercase/lowercase format conflicts. This limitation seriously reduces the usefulness of the Search/Replace function.

I was surprised to discover that Search/Replace does not work as advertised on the Apple IIe. As a test, I tried to change all the occurrences of the word *a* to *the* in a sample piece of text. I was careful to put a space before and after the *a* in the search string so I wouldn't accidentally change the letter *a* in all my words and end up with a mess like *thefter* instead of *after*. Despite this precaution, however, I got some unexpected results.

All my lowercase-word *a*'s became *The*'s with a capital *T*, and all the *A*'s became *THE*'s. Obviously, the Search/

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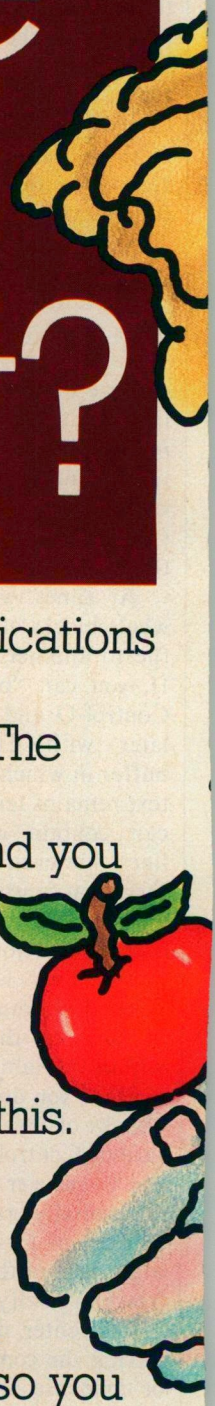

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CIRCLE 105 ON READER SERVICE CARD

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CIRCLE 113 ON READER SERVICE CARD

Replace function has some serious flaws that Artsci should have corrected before it ever released the Magic Window II program.

The Format Subsystem

The format subsystem controls the size and shape of the text page for both the screen and the printer. What Magic Window II shows on the screen is almost exactly what will be printed on paper. With the format subsystem, you can set the width and page length of text, select single- and double-spacing, and change several other formatting options.

If you do alter the line length, however, the text is not automatically reformatted to fit the new setup. You must use Control-G (for *glue*) to put the changes into effect on the screen.

The Filer Subsystem

The filer subsystem is mainly for loading and saving formatted files, files whose margins, spacing, indentation, and other format specifications you save along with the file. You can change formats later if, for instance, you need to alter the text width.

Another option is saving an unformatted file, which allows you subsequently to include part or all of it within a regular, formatted file. Thus, you can assemble a library of standard responses and create "boilerplate" letters, for example.

Using Magic Window II, you can also edit your BASIC programs or VisiCalc files. Another benefit of the filer subsystem is that it lets you use the DOS commands RENAME, DELETE, CATALOG, LOCK, UNLOCK, and INIT.

The Print Subsystem

When you use the print subsystem, you can make many choices about how you print your files. For example, you don't always have to print out the entire contents of a file: you can specify a starting page and the number of pages after it that you want printed. You also use this subsystem to set the printer for single-sheet, continuous unperforated, or perforated paper. You can also create a list of files for printing all at once in a specific order.

Printer-control characters (for underlining, boldfacing, alternate fonts, subscripts, superscripts, and so on) are embedded within the text with Control-B, followed by a special character. Thus, you won't have to set any of these in the printer subsystem.

Documentation

The documentation for Magic Window II is excellent, clearly written, and easy to read. The manual, approximately 140 pages, has eight sections. The first gives an overview of computers generally; the second part outlines the standard configuration process and summarizes the menu system; and the following sections give details about each of the subsystems. You find full discussions of menu options and practice exercises for everything from changing format options in a menu to using a printer. The diskette contains two useful practice files and the manual contains step-by-step instructions on how to correct the text, so you can get the feel of editing. A detailed index helps you find features the manual covers.

Wait for the Update

Although Artsci claims that Magic Window II was "designed for the successor to the popular Apple II microcomputer—the Apple IIe," Magic Window II is actually an Apple II or II Plus program that *can* run on the IIe. The program does not take advantage of the up- and down-arrow keys or the Tab and Delete keys found on the IIe but not on earlier Apple models. According to Artsci, an updated version of Magic Window II for the IIe with 48K or 64K was to have been introduced in the first quarter of 1984. The company says that the revised program makes use of the IIe's special features and fixes a few other bugs that were in the original program.

The update will presumably correct the problems in the Search/Replace function. Anyone with an old Magic Window package will be able to purchase the updated version at a special price, and all users who mailed in their warranty cards will be notified when the update is available.

Magic Window II is a rather good word processor, and unlike many of the more powerful word-processing packages, it can be mastered in just one or two days. For Apple IIe owners, however, I would strongly recommend waiting until the new, updated version is available. +

▶ PRODUCT INFORMATION

Magic Window II
Artsci
5547 Satsuma Avenue
North Hollywood, CA 91601
(213) 985-2922
Requires: Apple II, II Plus, or IIe
List Price: $150 (often discounted to $100)

▸ APPLE III/BY WILLIAM O'BRIEN

KEYSTROKE

DATA BASE AND REPORT GENERATOR

If you've ever kept a list of friends or birthdays or places to take your car to be repaired, then you've handled a database. Using one involves the commonplace act of gathering, storing, and reporting of information, and your Apple III could be a great help. You'll need one external disk drive, or a Pro-File hard disk if you want to keep a *lot* of information, and a printer. You'll also need something to explain to the Apple III *how* to do what you want. For that you'll need a program.

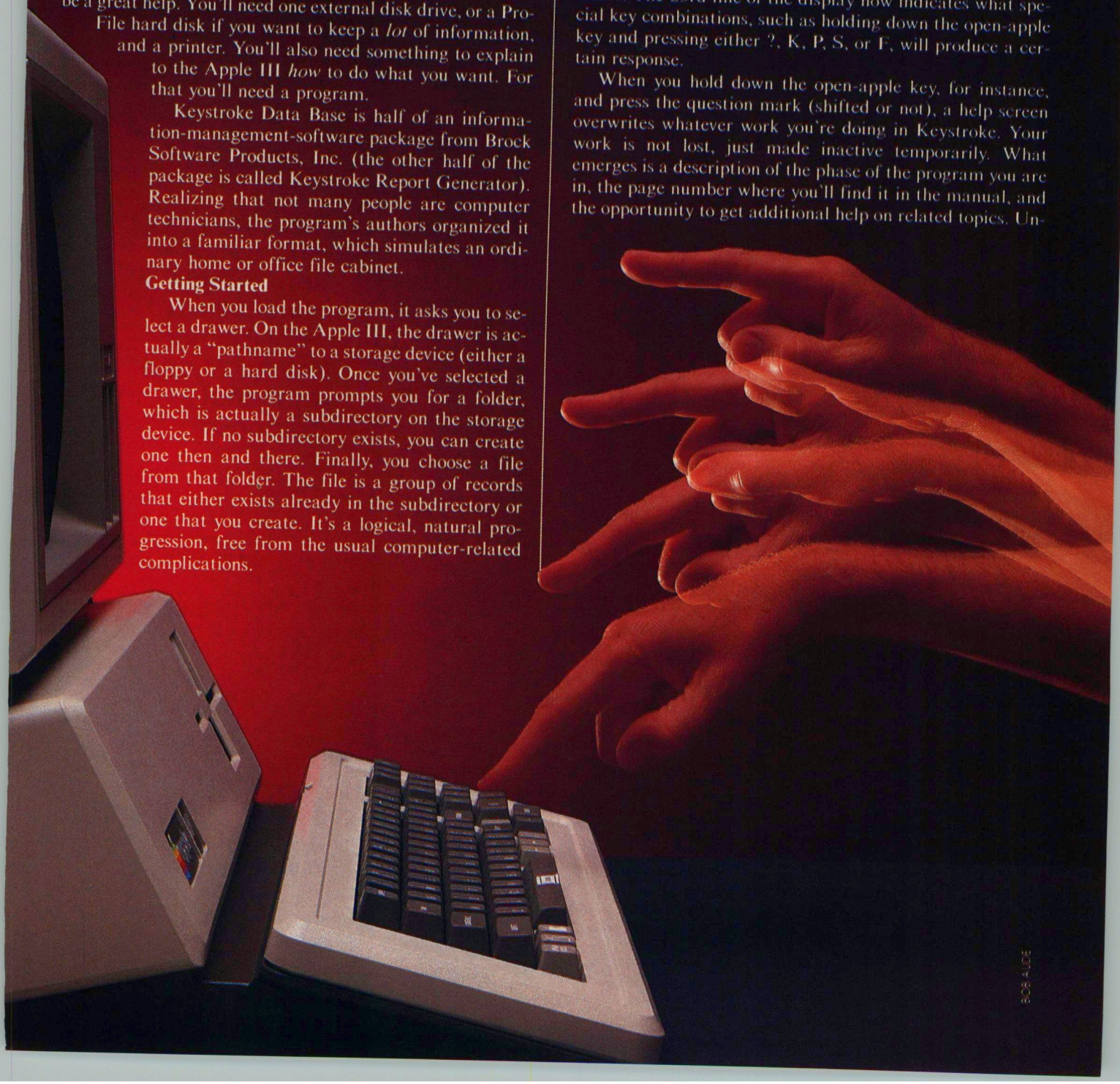
Keystroke Data Base is half of an information-management-software package from Brock Software Products, Inc. (the other half of the package is called Keystroke Report Generator). Realizing that not many people are computer technicians, the program's authors organized it into a familiar format, which simulates an ordinary home or office file cabinet.

Getting Started

When you load the program, it asks you to select a drawer. On the Apple III, the drawer is actually a "pathname" to a storage device (either a floppy or a hard disk). Once you've selected a drawer, the program prompts you for a folder, which is actually a subdirectory on the storage device. If no subdirectory exists, you can create one then and there. Finally, you choose a file from that folder. The file is a group of records that either exists already in the subdirectory or one that you create. It's a logical, natural progression, free from the usual computer-related complications.

Let's assume that you want to create an information file to track your collection of comic books. Once you've selected the name of the file with which you want to work, the screen clears. The 23rd line of the display now indicates what special key combinations, such as holding down the open-apple key and pressing either ?, K, P, S, or F, will produce a certain response.

When you hold down the open-apple key, for instance, and press the question mark (shifted or not), a help screen overwrites whatever work you're doing in Keystroke. Your work is not lost, just made inactive temporarily. What emerges is a description of the phase of the program you are in, the page number where you'll find it in the manual, and the opportunity to get additional help on related topics. Un-



BOB AUDE

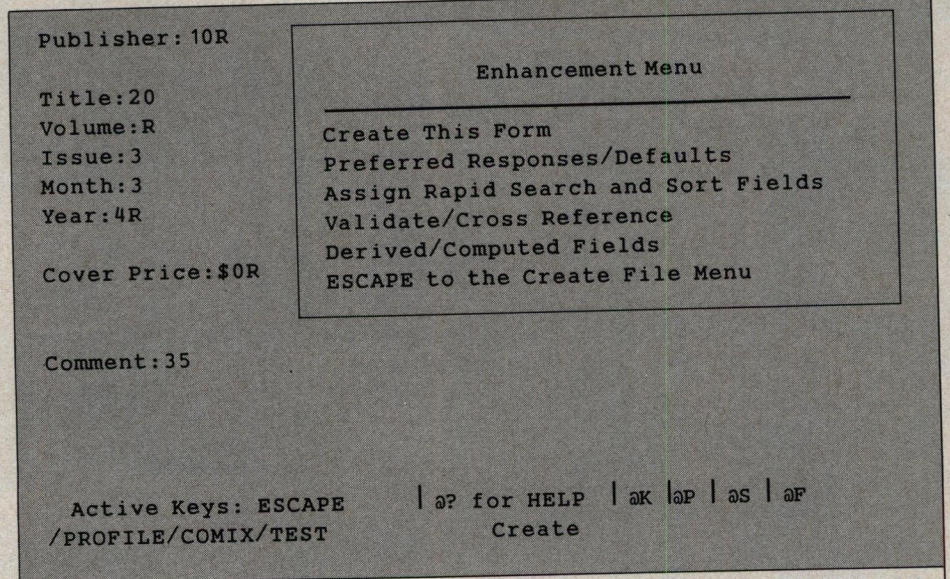


Figure 1: Basic form-creation screen including field descriptors, field lengths, format options, and the Enhancement menu

like some programs that provide only minimal help, in Keystroke the information is detailed and specific.

The Scratch Pad

Using the open apple and the S key moves you to the scratch pad. On the right side of the screen, a rectangular section opens, and you can doodle there. It's completely disassociated from the program itself, and in addition to providing a place for you to jot down notes to yourself, it can serve as a calculator that supports the four primary mathematic functions.

The 24th screen line indicates what your current drawer/folder/file is, as well as the stage of the program you are in. In the case of figure 1, it would be the Create mode, in which you can create a new file.

Creating a Database

With a nearly blank screen before you, in the Create mode, you type in the descriptions that will best remind you of the information you want entered—they're called field descriptors. After each one, place a colon and follow it with a number, a letter, or a combination of both, which indicate any special format you want the information to appear in. (See table 1 for a list of available formats.)

Once you've typed in the descriptors, perhaps you find that you're not satisfied with the arrangement of the information on the screen. The control and arrow keys let you change the layout easily. The left arrow deletes spaces, moving text to the left, the right arrow inserts spaces, moving text to the right.

Don't let the small number of fields in our example mislead you into thinking that Keystroke is limited. The program allows up to 90 fields per record, each with a maximum of 74 characters. Also, each record cannot contain more than 4096 characters. Disk space permitting, you can have up to 32,000 records.

Once you've designed the form to your satisfaction, pressing the Enter key on the numeric keypad moves you out of the Create mode. At this point, if you decide that you really don't like the way the format looks, you can forget the whole thing without saving the form. Or, you might decide that it just needs a minor adjustment, in which case you can go back and reedit it. The upper right corner of figure 1 shows the Enhancement menu. By pressing the Return key, you can insert predefined answers into your form that accommodate information that remains fairly constant from record to record.

To find any of the records you've entered, you specify which fields the program should use for searching and sorting. You can select up to four key fields. The program can cross-reference information in another file. This ability to grab information from outside the current file is what defines Keystroke as a relational database.

Sometimes the information you need depends on completion of arithmetic functions. If you were keeping track of sales, the total volume of money received would not just be the price of each item, but would also include incidental costs such as sales tax and shipping.

Usually, sales tax is broken down into a percentage of the net sale, and the total is the sum of the tax and shipping charges. Just create the Tax Rate, Tax Amount, and Total fields. Enter the tax rate and shipping amount, and have Keystroke perform the multiplication and addition to derive the total amount. Add it to a subtotal to produce the gross-sale dollar figure. Figure 2 shows the process put into practice. Now you know the entire procedure for creating a file and adding enhancements to make it easy to work with.

This ability to grab information from outside the current file is what defines Keystroke as a relational database.

Table 1: FIELD FORMATS

Type	Command	Format Produced
Phone Number	P	( )_____- _____
Date	D	__/__/__
Auto Date	A	mm/dd/yy (taken from the Apple's clock)
Soc. Sec. Number	S	___-__-_____
Dollars & Cents	$x	$x,xxxx.xx (two decimal places, with x being a number indicating the digits to the left)
Digits	x.y	xxxx.yyy (x places to the left of the decimal point, y places to the right)
YES/NO	Y	Yes or No
Auto-Increment	I	x+1 (x is the value in the same field in the previous record)
Repeat	R	(placed after the field length value)

Keystroke Report Generator

With Keystroke Data Base's companion program, Keystroke Report Generator, you can produce a variety of reports. You can change field names and lengths and can use counts, averages, subtotals, and totals. A helpful feature of the program is that it draws a ruler across the screen showing the exact position where the fields will be printed, which comes in handy when you're preparing a file for printing. You can save up to eight print and file formats and select them from the report menu at a later time. If you change printers, you can describe several and save the descriptions, down to enhancement details and driver names.

If you have been shopping for database-management programs, you may recognize some similarity between the Keystroke package and PFS:File and PFS:Report from Software Publishing Corporation. They both use the Escape key to bail out of program activity, the Enter key to initiate activity, and the Tab key to advance from field to field. On either, when you use the ". . "specification when, retrieving data, you get all the information in that field. They both come in separate database and report packages.

PFS was, undeniably, first in the ring, producing a simple but workable database package. Keystroke, however, offers features that PFS does not have. Both programs contain the basic features that any such system must have. PFS's greatest claim to fame is its ability to restructure a file format; Keystroke adds all the enhancements we have looked at, and more.

Copy-Protection Woes

What is troublesome, though, is that these Pascal-based programs, like their predecessors, are copy-protected. You can copy both the database and report diskettes with the SOS Utilities program without getting error messages. Booting with either of the loader disks, on the other hand, produces a whirlwind of drive activity, even a copyright message and instructions for obtaining help messages, but no other results. You have to use the original loader diskettes. Even that restriction wouldn't be so bad if there were enough room on the originals to add drivers.

Brock supplies you with a minimum number of drivers: Console, Printer, and Profile. They fit on the leader diskettes but leave only a few blocks of space. I use a PKASO parallel printer interface and drivers for a Micro-Sci A143 large-capacity disk drive. Even when I remove the supplied Profile driver from a loader diskette, I still have to erase the QUARK.INSTALL program to obtain sufficient space. If I needed all three drivers at the same time, I would certainly have a dilemma resulting from the copy-protection.

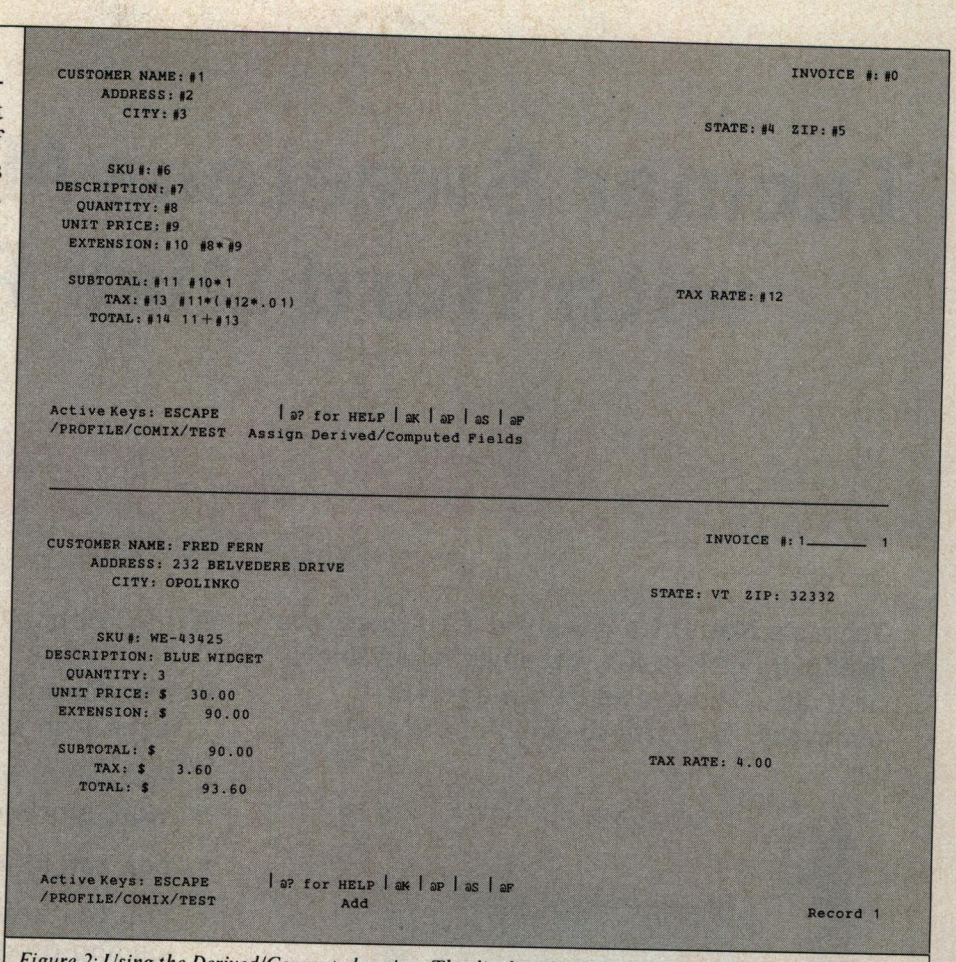


Figure 2: Using the Derived/Computed option. The display shows numbered fields and their associated formula. The tax field, #13, uses the subtotal value and multiplies it by a tax rate, from #12, that has been reduced to decimal value. The lower view shows the results of the calculation.

You may recognize some similarity between the Keystroke package and PFS:File and PFS:Report.

The manuals for both programs are excellent. The liberal sprinkling of examples almost obfuscates the instructions. The command-menu structure that transports you from level to level within the program is also effective. Without conscious effort, you won't be able to get lost in the corridors that house the many different functions.

The programs' help screens are unparalleled. They are to the point and precise, dealing with the section of the program you are currently using. A particularly helpful aspect of these screens that few other programs provide is that they cross-reference the page numbers in the manual that also deal with the topic at hand.

Brock Software has taken the concept of organizing a database and made it available to infrequent computer users without taking a simplistic, condescending approach. Keystroke Data Base and Report Generator do not comprise as powerful a package as dBase II or Formula 2.0, but they do offer a new level of personal-database management on the Apple III. ✚

PRODUCT INFORMATION

Keystroke Data Base
Keystroke Report Generator
Brock Software Products, Inc.
P.O. Box 799
Crystal Lake, IL 60014
(815) 459-4210
List Price: Keystroke Data Base, $249; Keystroke Report Generator, $149
Requires: Apple III, 256K RAM, at least one external disk drive in addition to the built-in drive

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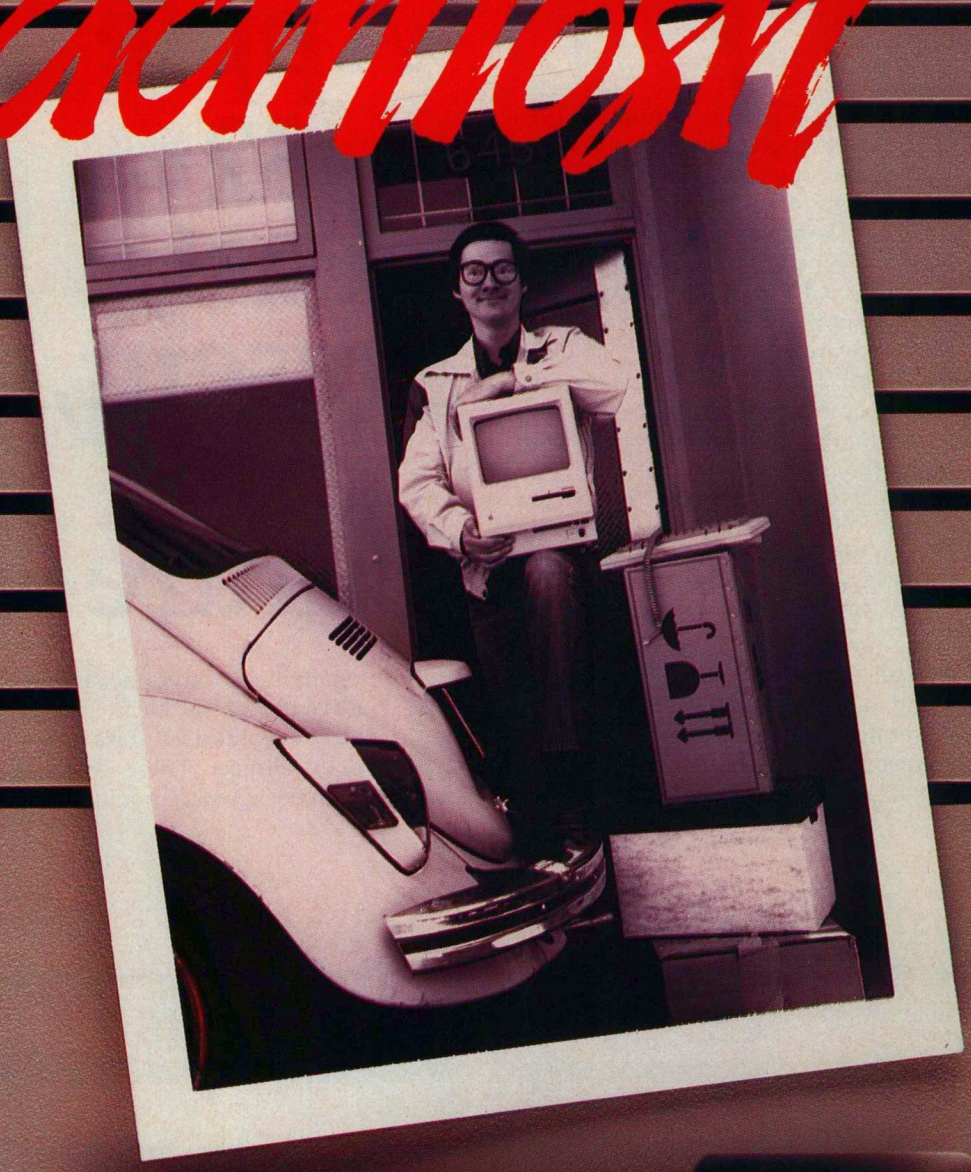
CIRCLE 205 ON READER SERVICE CARD

A+

Macintosh



The Apple 32 Line:
PAST, PRESENT & FUTURE

Installing the Programmer's Switch

Our First Peek Inside the Mac

MacTEP Revisited

New Products for the Macintosh

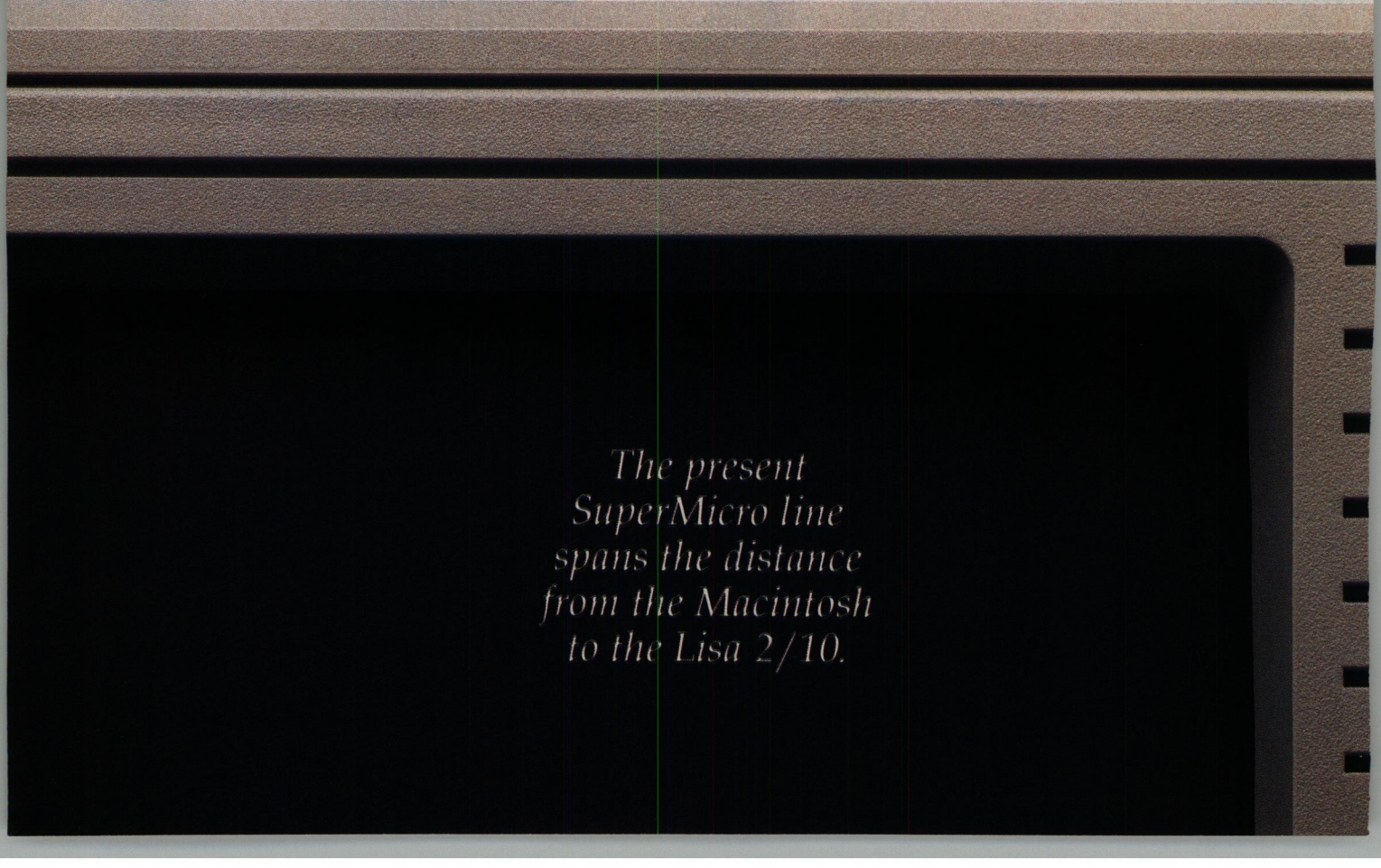
Apple 32 Past, Present, and Future

In January 1983, Apple computer introduced a new computer, the Lisa, which included 1 megabyte of RAM, a 5-megabyte hard-disk drive, and two 800-kilobyte 5¼-inch floppy-disk drives. The Lisa carried a price tag of $10,000 and came supplied with an advanced set of software known as the Lisa Office System. The office system included an operating system that created an imaginary "desktop" on the computer screen. On the desktop were "icons," small graphic representations of objects such as data files and programs. The Lisa also made use of "windows," which allow you to view several operations on the screen at one time, and a "mouse," which is a small box with a ball on the bottom and a button on top that you roll around on a flat surface to move the cursor and select items on the screen.

The office system also included seven integrated-software packages called LisaWrite, LisaCalc, LisaGraph, LisaDraw, LisaList, LisaTerminal, and LisaProject. These seven packages were designed to provide all of the most common software applications needed in an office. LisaWrite is a word-processing program; LisaCalc is a spreadsheet; LisaGraph is for preparing charts and graphs; LisaDraw is for technical and freehand drawing; LisaList is a database program; LisaTerminal provides telecommunications abilities; and perhaps the most innovative is LisaProject, which is a "critical path management" analysis program for planning projects of all types.

When the Lisa was introduced, it was a revolutionary new system that offered power and ease of use that no other personal computer had. The $10,000 price tag scared some people off, however, and only about 20,000 computers were sold during 1983—a disappointment to Apple, which had higher hopes for its amazing new computer. As a result, Apple decided to take a different strategy with the

DOW, CLEMENT & SIMISON



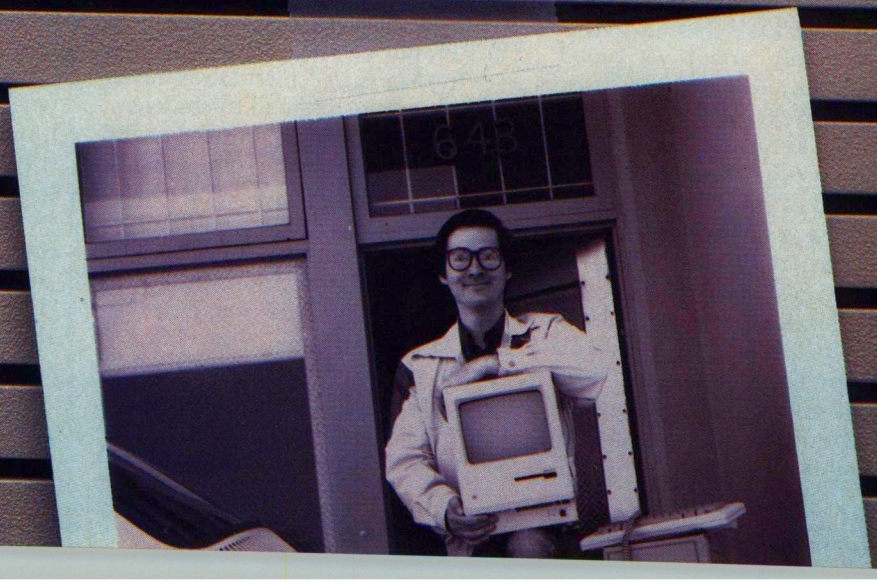
Lisa product line and developed the Lisa 2, which was announced in January 1984 at the same time as the Macintosh. Since both the Lisa 2 and the Macintosh are based on the Motorola 68000 microprocessor and use similar software technologies, Apple consolidated the Macintosh and the Lisa into a single product line dubbed the "Apple 32 SuperMicros."

A Little History

Late 1979 was a time of planning at Apple. The company figured it should develop some new products over a couple of years and began two substantial projects, one a computer and the other a disk drive.

A Lisa Division

Apple created a new division headed by John Couch to develop the Lisa. The Lisa used two existing technologies. One was the mouse technology developed at SRI by Doug Engelbart, and the other was a "user-



interface" that used graphic images called icons to control applications. It was developed at Xerox's Palo Alto Research center (PARC) for that company's Star project. One of the concepts of the Xerox project was to have a computer screen that imitated a desktop. Internally, the Lisa has an operating system that allows it to do two things at once (e.g., calculating and printing), and in many ways it resembles a minicomputer, rather than a typical personal computer. Lisa has received strongly mixed reviews—Some people love it, and others don't see what all the fuss is about. Despite many rave reviews and dedicated fans, the Lisa's market reception was generally disappointing to Apple.

The Little Disk That Didn't

Have you ever wondered why the Lisa has an external hard-disk drive and two floppy-disk drives, when it could have a floppy and a built-in hard disk in less space for a lower price?

In 1979 Apple formed its Peripherals Division, headed by John Vernard, which began developing, among other things, a floppy-disk drive originally called the Twiggy (because it was to be thin like the model Twiggy). It was to be an inexpensive and reliable drive that would store more than five times as much as a Disk II and retrieve it several times as fast. This drive used 5¼-inch floppies to store 800K bytes of information, using a combination of special diskettes and read/write heads in new locations and varying the drive speed as it read inner or outer tracks. A 143K Apple II diskette can store about 70 typed pages from a simple word processor such as Apple Writer; 800K can store about 800 pages.

The Twiggy project ended up being a burden to Apple. During the development phase of the Lisa, Apple planned to operate the Lisa with two Twiggy drives and no hard disk. Apple also announced that it would offer these drives for the Apple II and III (the Unifile and Duofile). Apple subsequently canceled the announcement, however, and canceled plans to operate the Lisa solely from Twiggies.

Apple has embraced outside software vendors as the source of applications for its 32-bit line and is making a considerable effort to attract and assist outside product developers.

The advanced integrated "office system" for the Lisa required a lot of online disk memory, so Apple's engineers hastily plugged in an external ProFile hard disk in addition to the Twiggies and the Lisa entered the marketplace a more expensive and unwieldy system than Apple had originally planned.

In 1980 an Apple employee named Jef Raskin began a little research project called Macintosh as an outgrowth of the Apple II/III division. His original concept resembled the idea of the "Dynabook" proposed by Alan Kay at Xerox PARC some years earlier. Raskin's prototype was smaller than a Macintosh, looked rather like a book, and ran on batteries when necessary. Raskin wanted to build something you could take to the beach to do your programming. In the summer of 1981 Steve Jobs took over the Mac project, and the concept of the Macintosh began to change.

At first the only connection between the Macintosh and the Lisa was that they used the same processor. As the programming code for the Macintosh developed, the style of the user-interface grew more and more like the Lisa's, and the two computers came to share the same kind of mouse cursor controller and power cord. The operating systems are different, however, and the more closely you examine their software code or hardware, the less alike they seem to be. For example, the operating system of the Lisa is loaded off a diskette, whereas the operating system of the Macintosh is built into the machine in read-only memory (ROM).

Apple is trying to meld these computers into the Apple 32 SuperMicro product line, somewhat late in the game. John Couch, John Vernard, and Jef Raskin have now departed the company. For the foreseeable future, Apple is out of the business of advancing floppy-disk technology; the microdisks in the Macintosh and the Lisas come from Sony. Apple has embraced outside software vendors as the source of applications for its 32-bit line and is making a considerable effort to attract and assist outside product developers.

Organizationally, Apple is trying to run a tighter ship. The company has consolidated the smaller Macintosh project and the larger Lisa Division to form the Apple 32 SuperMicro Division. The head of marketing for the 32 SuperMicro Division is Mike Murray from the Macintosh group; the head of engineering is Bob Belleville, also from the Macintosh group; and the head of the division is Steve Jobs, the leader of the Macintosh project. From the Lisa Division about 75 people have been laid off, and there have been layoffs and organizational changes in the Peripherals Division as well.

The Present SuperMicro Line

Figure 1 shows the 32-bit product line. The common features are the 68000 processor, the ability to run Macintosh software, the use of the microdisks, and close similarity in the way users control programs. Present limitations include the inability to run the Macintosh and Lisa 2 operating systems at the same time, the inability to run the Lisa office system on any model with less than one megabyte of memory or without a hard disk, and the inability to interchange data freely among Lisa and Macintosh applications: most Lisa 2 applications can exchange data; some cannot. Most Macintosh applications can exchange data; some cannot. Cur-

	Price	Memory Size	Micro disk	Mac Software	Lisa Software	Hard Disk
MACINTOSH	$2495	128K	Yes	Yes	No	No
LISA 2	$3495	512K	Yes	Yes	No	No
LISA 2 + Memory card	$4990	1M	Yes	Yes	Yes	No
LISA 2/5	$4495	512K	Yes	Yes	No	5-M External
LISA 2/5 + Memory card	$6990	1M	Yes	Yes	Yes	5-M External
LISA 2/10	$5495	512K	Yes	Yes	No	10-M Internal
LISA 2/10 + Memory card	$7990	1M	Yes	Yes	Yes	10-M Internal

Figure 1: The Apple 32 SuperMicro product line

rently, no Lisa 2 application can easily exchange data with a Macintosh application.

All models of the Lisa 2 do run Macintosh applications, however. I've tried out several Macintosh applications on a Lisa 2, and they worked well. To run a Macintosh application program on the Lisa 2, you insert a disk called MacWorks into the microdisk drive. The MacWorks diskette contains the Macintosh operating system, which you load into the Lisa 2. You can then remove the MacWorks disk, put in a Macintosh application disk, and proceed as if you were running a Macintosh.

People who are accustomed to the Lisa 1 or Lisa 2 will find that the comparable Macintosh applications are limited in capacity, such as the size of a spreadsheet, and that they feel somewhat different. Most of the time, the Macintosh software is faster and seems perkier, but when the Macintosh is reading and writing software to and from the microdisk, its response is sometimes more sluggish than that of the Lisa.

The pixels, the basic dots that build up screen images, have a different shape on the Lisa 2 than on the Macintosh; Macintosh pixels are square, and Lisa pixels are upright rectangles. The difference does not present a problem; Macintosh images do not look too distorted on the Lisa.

The Lisa 2 part of the Apple 32 SuperMicro product line is in a rather curious position in the marketplace. The Lisa 2 machine in the basic configuration of 512K RAM and the lowest retail price of all the Lisas ($3495) can't run the Lisa office-system software. These machines are like desktop Macintoshes with much more memory. Some Apple staffers have nicknamed the Lisa 2 the "Big Mac" and expect to sell the computer to people who want to run Macintosh software on a machine with larger memory and a larger screen.

Some applications may allow use of a larger document (file) with the larger amount of memory available on the Lisa 2. For example, MacWrite could handle many more pages of text, and Multiplan could offer more cells in each spreadsheet than on the Macintosh. The Lisa screen is larger (12 inches vs. the Macintosh's 9) and in resolution (364 lines by 720 dots vs. the Macintosh's 342 by 512). Since in running Macintosh software, you are limited to applications that fit on a microdisk, the crowded "desktops" you so often see on Lisas will be less crowded when a Lisa 2 runs Macintosh software.

The Future

Currently, Apple offers none of the office-systems software that runs on the Lisa 2/5 or 2/10 without the additional memory card that brings system RAM up to 1024K. Apple notes the situation in its specifications: "Note that one or more of the seven applications of the Lisa office systems require one megabyte of RAM and a hard-disk drive."

Rumors from Apple suggest that the operating system and some applications may be compressed in the future to run on the half-megabyte versions of the Lisa and the upcoming half-megabyte version of the Mac. Other sufficiently compact applications may come out of Apple or other companies.

Apple has announced an MS-DOS card, which would allow a lot of IBM Personal Computer software to run on the Lisa 2. Such a card would allow many uses for the less expensive 512K Lisa 2's, with or without hard disks. The planned date for the completion of this project is "the end of the summer." These cards will make the Lisa 2 a machine to run MS-DOS applications, but it is not clear what sort of information transfer may exist between the MS-DOS world and the Lisa desktop. Rumor has it that MS-DOS will be available as a window on the Lisa desktop.

Apple announced that it would disseminate specifications in April for AppleBus, a small-scale local-area network and method for connecting peripherals, in the hopes that developers would create uses for it. When uses appear (perhaps in the fall of 1984), a user who has both Lisas and Macintoshes connected to AppleBus will be able to transfer Lisa files rapidly and easily between Lisas, and Macintosh files among Macintoshes and Lisas running MacWorks, and to share peripherals such as printers, plotters, or hard disks.

Apple says it is working on file compatibility, which would open the door to transferring information from Lisa to Macintosh applications and vice versa, but does not expect it to be available immediately. True system compatibility, a Macintosh window running on the Lisa desktop, for instance, is much harder to achieve and will be under development for quite some time.

Several outside developers have announced software that will run on the half-megabyte Lisa 2/5's and Lisa 2/10's. They include two versions of the UNIX operating system, which

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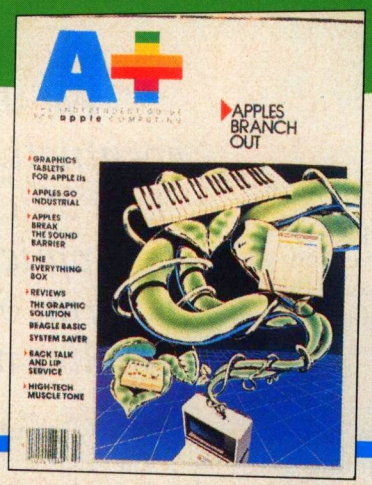

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supports a multitude of applications. Unipress will provide a version of Unisoft's Uniplus multiuser UNIX. Santa Cruz Systems will offer Xenix. Open Systems, which has a version of its accounting system, Software Fitness, running on the Lisa 1, will offer a new version. Likewise, BPI will offer versions of its accounting system. None of these offerings currently run on the Lisa desktop, although they may do so in the future.

In summary, only limited software integration exists between the Lisa and the Macintosh, and the Apple office-system software for the Lisa 2 cannot run without an extra memory card. We can expect to see compatible files in the near future and, in the long run, attractive prospects such as applications that run on a Lisa 2/10 in the office, on a Macintosh at home, on a Macintosh on the boss's desk, and on a Lisa 2/5 on her secretary's, all connected by AppleBus. In the near term, we can expect many applications for the low-end Lisa 2 with 512K RAM. Through UNIX they may be very functional, but they may not have the ease of use and other features of the Lisa office system from Apple. We should eventually see most Lisa office-system applications run on the smaller machines, but it is not clear under what restrictions they will operate.

The Update

Apple has offered to update all Lisa 1's to the equivalent of the Lisa 2 with the extra memory card without charge. Apple provides dealers with kits and pays them $50 to perform the upgrade. Here's how it works for users.

In backing up a substantial amount of data, the most complicated part is transferring backup material to microdisks, which you must do by using ProFiles. You can gain storage space on your ProFile by deleting all the old versions of the office-system software, which the update will replace. If you have more than four or five Lisa 5¼-inch floppy diskettes with backup material, you will probably need a second ProFile. If you have enough ProFile space to hold all your data, you put it on ProFile(s). If not, you select a dealer, tell him you plan to update your Lisa with him, and ask him for the loan of enough ProFiles to hold your data.

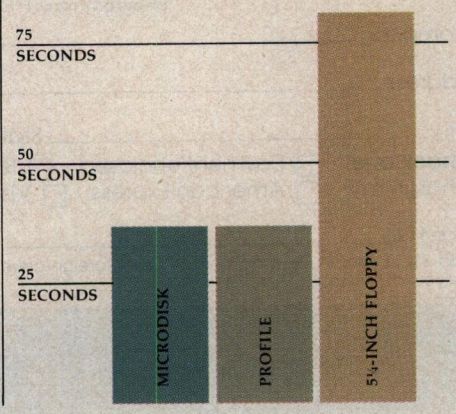
We should eventually see most Lisa office-system applications run on the smaller machines.

Apple has asked dealers to move the backup material from the floppies onto the ProFiles if you ask them to, but you may want to evaluate and organize the data as you transfer it yourself.

After you've organized your backup data, take your Lisa 1 to the dealer along with your system diskettes. Then your dealer replaces the cage that contains your old drives with a new cage that holds one microdisk drive, and mounts a new slotted bezel on the front of the computer. Then the dealer takes off the back of the machine and replaces some circuitry. Very simple. The dealer ends up sending your old floppy-disk drives and old system diskettes back to Apple and hands you new system microdisks with the 2.0 version of Lisa software and errata sheets to update your manuals. Yes, if you somehow got your system software without getting diskettes, you have a problem.

Apple also offers to upgrade Lisas to a ten-megabyte hard disk with a kit that makes your Lisa 1 into the equivalent of a Lisa 2/10 with the half-megabyte memory card. This procedure is a little more complicated than the upgrade to the microdisk because it involves replacing the power supply and some other circuitry, but it is still only half an hour's work or less. This kit costs $2400, and the dealer will charge you normal labor rates for the conversion.

Figure 2: Comparative transfer speeds of LisaList files using different disk drives



What Is It Worth?

Lisa owners must choose to update their machines or not. If you back up a lot of data, if you have large volumes of different sorts of work, or if you duplicate floppies often, for any reason, you are going to lose some real conveniences by choosing the update route. Say you are keeping records of inventories. Your total diskette storage outside your ProFile will suddenly drop from 1.6 megabytes to 400K bytes. Whereas you have been able to duplicate 800K bytes with a single command, you will have to transfer material piecemeal to the ProFile and off again to back it up.

If you are running Macintosh software on a Macintosh or Lisa, you can attach a second microdisk drive. Microdisks are selling for about $5 each, and Lisa 5¼-inch floppies for about $12 each, so price is close to a wash. Microdisks are faster. The spec sheets list 28 milliseconds as the maximum time to seek a track on a 5¼-inch floppy and 12 milliseconds for the same function on a microdisk.

To test what the update means, I took a ProFile loaded with my work to Apple and hooked it up to a Lisa 2/10. I did some of my normal work to get a feel for the difference. The microdisks are zippier. I also timed some file transfers and a search to get a more objective measure than "feel" and more realistic than seek times. Figures 2 shows some of the results. Transfer is to or from the named medium and the 2/10's internal hard disk. Each hard disk had about one megabyte free, and each floppy was about half full before the transfer. Each bar is the average of four trials, and there was some variation (because of factors such as the way the

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information happened to be arranged on the disk). For the search, I called the file from each medium and searched immediately for a text string at the end.

Speed is not the only compelling reason to update. The rated mean time before failure is 2000 hours for the Lisa 5¼-inch drives and 8000 hours for the microdisks, four times better. Reliability figures for the drives are not available, but my experience with the 5¼-inch drives is they are troublesome, whereas reports on the microdisks are very good.

Apple has promised to support Lisa 5¼-inch drives for five years, but as they become a rare item, so will the parts to fix them. Eventually, repair will mean sending the drives to Apple, with attendant delays. On the other hand, the microdisks appear to be a popular item, they are in place in Hewlett-Packard and other machines beside the Macintosh, and knowledgeable people and parts are likely to be widely available.

Finally, and most important, all future software from Apple and other firms will be distributed only on microdisks.

So, I have to vote for the update. We may lose convenience, depending on our work, but we will gain speed and reliability and maintain access to the growing world of Lisa and Macintosh software. ✚

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WHAT'S IN A NAME?

Computerists have been involved in a considerable debate lately regarding the description of microprocessors. The focus of this debate is how many "bits" a processor has. You probably have heard the terms "8-bit processor," "16-bit processor," and "32-bit processor." These phrases generally describe a processor's computing power. These descriptions can often be misleading, however, since the terms mean different things to different people.

The word *bit* is derived from "BInary digiT" and refers to either the number 0 or the number 1, the two digits in binary arithmetic. To work with numbers larger than 1, a computer joins groups of 0's and 1's (binary digits) together to form larger numbers. For example, the number 20 is expressed as 10010, and the number 100 is expressed as 1100100.

Most of the first popular microprocessors such as the 6502, 8080, and Z80 are 8-bit processors, meaning that they can only work with a group of 8 binary digits at a time when processing information. A 16-bit processor can work with a group of sixteen binary digits at a time, and a 32-bit processor can work with 32 binary digits at a time. The more binary digits a processor can work with at once, the more complex the tasks it can work on and the greater the mathematical precision it can achieve. Therefore, a 16-bit processor is more capable than an 8-bit processor, and a 32-bit processor is more capable than a 16-bit. Just because a processor is more capable doesn't always mean that it is more powerful, though. Just as a 4-cylinder Porsche can outperform some 8-cylinder cars, a high-speed 8-bit processor can be more powerful in certain applications than some 16-bit processors. As a general guideline, however, the more capable the processor, the more powerful it is. We have two ways of measuring the number of bits a processor can work with. One measures how many bits the "bus" or input/output channels of the processor can carry. For people who favor this measurement system, if the bus can handle 8 bits at a time, then the processor is an 8-bit processor; if the bus can handle 16 bits at a time, you have a 16-bit processor; and so on. The other measurement of a processor has to do with the number of bits the processor can work on in its internal calculations. Most people favor this method of describing processors. Under this system, if a processor can work on 8 bits at a time in its internal calculations, it is an 8-bit processor; if the processor can work on 16 bits at a time, it is a 16-bit processor.

Many processors use the same number of bits for internal calculations as the number they can carry over the bus at one time. Describing these processors has aroused no debate, since both methods of measurement give the same result. The debate centers on processors that can use a different number of bits for internal calculations than the amount they can carry over the bus.

The two processors that are causing the most disagreement and dispute are the 8088, used in the IBM Personal Computer family, and the 68000, used in the Apple 32 SuperMicro family (Macintosh and Lisa). The 8088 can work on 16 bits for internal calculations, but can carry only 8 bits over its bus. The 68000 can work on 32 bits internally, but can carry only 16 bits over its bus. The people who describe processors by the number of bits that can carry over the bus call the 8088 an 8-bit processor and the 68000 a 16-bit processor. I am one of the people that describes processors by the number of bits the processor can work on in its internal calculations. Using this method of description, an 8088 is a 16-bit processor, and the 68000 is a 32-bit processor. I think that this way of describing processors is more accurate, since it is more directly related to the microprocessor's internal processing and mathematical abilities.

Frederic E. Davis

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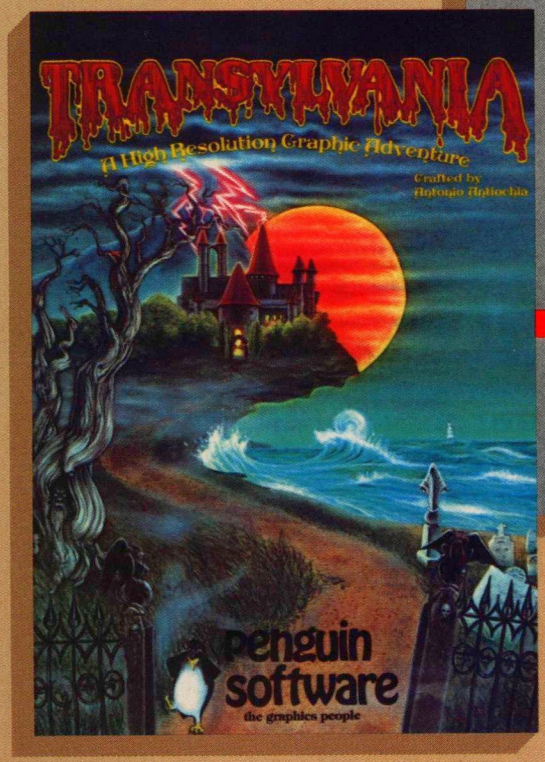

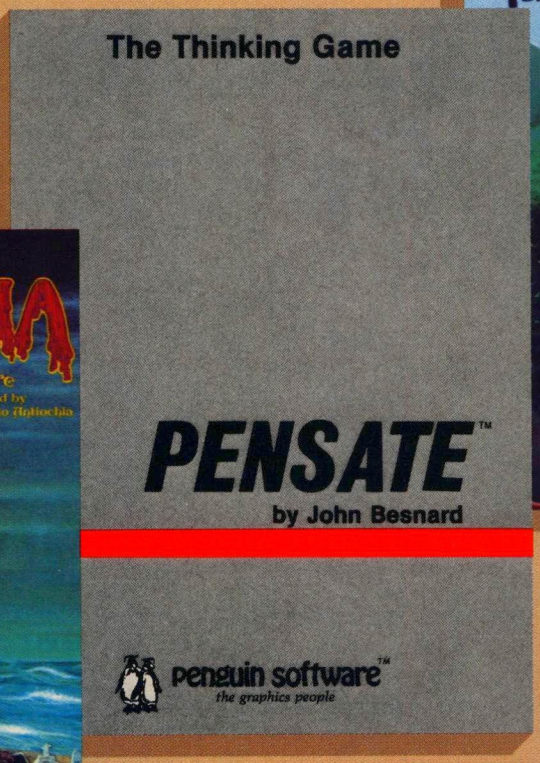

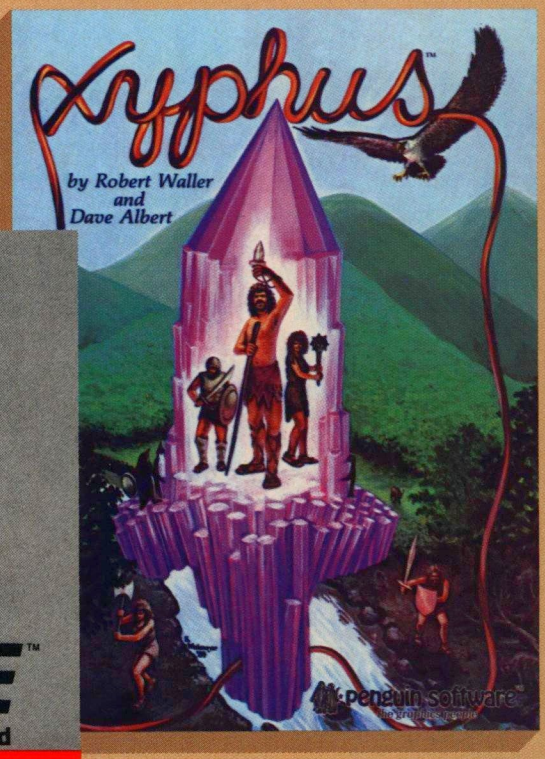

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How to Install the Programmer's Switch

You may need to go beyond the manual to get the most out of your Macintosh.

The Macintosh manual that Apple Computer supplies is a good general reference source. Its only problem is that it's not as specific about many things as it could or should be. A perfect example is the programmer's switch that comes with each machine. It's a plastic part, engraved with the words *Reset* and *Interrupt*, that gives you access to these two functions when you correctly install it on your Macintosh.

The manual contains a picture and a reference to the switch. It says that directions for installing it are on the unpacking sheet (the unpacking sheet?). A dealer opened and tested my Mac—it didn't have an unpacking sheet when I got it. I did find a recommendation, on page 127 of the manual, that Macintosh owners not install the switch unless they intended to develop programs for the Macintosh.

Unfortunately, in situations like this one, you can do more harm than good if you experiment to find out how to install a part. Since I had no clues, the possibility of damaging the plastic switch was great. Apple used to go out of its way to provide complete and accurate information about its computers, but somewhere along the way, the pioneering spirit born with the Apple II was bred out of the Macintosh. Perhaps it's time to open up the frontiers again.

Interrupt

Apple computers have always incorporated Break and/or Reset keys, with good reason. Whether you're running your own program or some "canned" package, you may, at times, find yourself in difficulty. Sometimes, poorly written programs can lock you out of your computer, and at other times, a mild burst of static can cause the same effect. In either case, the result is that your machine will sit there, idly chatting with itself, and exclude you from participation. Your only alternative at this point is to find some way to interrupt what it's doing.

Here's where the interrupt key comes in handy. It halts the execution of any application and brings the computer back to its next lower level of activity. If you were using a machine-language program, for instance, you would emerge from the lock-out at the operating-system level. Were it a BASIC program, you would be back at the BASIC command level, with the contents of the program still intact.

It's the electronic version of "Pardon me, but I'd like to join this conversation. After all, I am sitting here." The computer considers it a polite request. It even lets you complete any valid disk functions that were interrupted.

Reset

Using reset, on the other hand, is a "Jesus in the temple" situation. If you use the Reset key, you interrupt whatever the computer's doing and destroy the contents of memory. Everything is thrown into disarray—so much so that the machine pretends that you've just turned it on. Resetting a computer is, in fact, also called "warm booting." Everything in memory is discarded and any built-in programs, perhaps in ROM (read-only memory), that normally run when you first turn on the machine run again.

Using either of these functions on a Macintosh can be a disaster. Some of the things the Mac does with disks are not complete until it has ejected the disks or loaded a program. If you reset or even interrupt it before the disk functions are taken care of, you can find yourself with program directories that have not been correctly updated. It's even possible to destroy all of the information that the Macintosh needs, making the disk unusable—not a pleasant scenario.

As with anything, though, judicious interrupting and resetting is acceptable if you know that all of the system-level disk functions have been completed. When you're sure that any renaming or deleting of files has been done, or if you don't care, then the reset or interrupt proce-

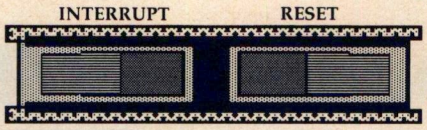

Figure 2a: The programmer's switch

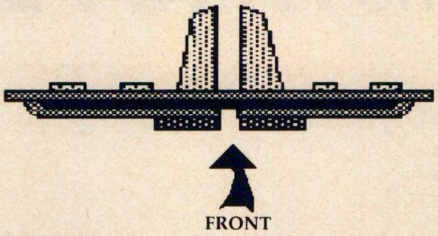

Figure 2b: Side view of programmer's switch

dure can remove the logjam and bring you back to a working level.

Clues

On the Apple II, the Break, or Interrupt, key occupied a prominent position on the keyboard. It was so prominent, in fact, that people could accidentally press it at the most inopportune times—and they complained. When Apple designed the Apple III, the Interrupt "key" became a push-in switch placed behind the keyboard and slightly below its plane. When you used it with the Control key, it became a Reset switch. Despite these precautions, Apple still received some complaints about accidental contact with the switch.

In the case of the Mac, you can search all over the keyboard and every part of the main unit, and you'll have trouble finding the Reset and Interrupt switches. They're well concealed, to say the least. Along both sides of the computer, along the bottom, you'll find two rows of vents that are part of the convection cooling system the Mac uses. If you look at both sides, you'll notice that the left differs slightly from the right. As you can see in figure 1, the rearmost vertical support extends only halfway

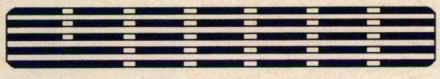

Figure 1: The Macintosh vent

down the vent. Were you to shine a light in there, you would see two circular switches. The one toward the front of the machine is the Reset switch, and the other is the Interrupt switch. Apple has done a good job of preventing their accidental use—they're unreachable from the outside, which is why you need the programmer's switch.

Figures 2a and 2b are two views of it. Actually, it's not a switch per se, but a pair of actuating arms with finger tabs. Note the two protrusions in the side view. They engage the real switches that you found below the Mac's side vent.

Apple gives you a clue about the installation on page 127 of the Macintosh manual. It has a photo of a hand reaching for a switch near the rear edge of a Macintosh. The small protrusions evident in figure 2b engage the edges of the bottom and third slats of the vent, clamping the "switch" in place.

With the power off and all cables to the Mac removed, turn the unit on its side and locate the gap, which spans three slats, where no brace blocks the vent. The actuator arms slip through the second opening from the bottom, which allows the side clips to engage the edges of the slats above and below. They snap into place, positioning the switch flush against the Mac's cabinet. While you're trying to mount it, you'll be thinking "I'm going to break this!" You won't. You can use the tips of your thumb and forefinger to compress the side clips if it really gives you problems, but it will fit. Figure 3 shows you how it looks after you install it.

When the switch is in, reconnect all the cables and turn on the power. Before you insert a disk, reach back and press in the finger tab closer to the front of the machine, then release

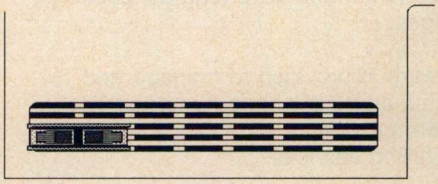

Figure 3: Macintosh vent with switch installed

it. You'll briefly think that nothing is happening, but be patient. The power tone will sound, and the Mac will look as though you'd just turned it on again.

Now reach back and depress the Interrupt tab. Remember the definition of *interrupt*. At this level of machine operation, there is no lower level to which the computer can revert. The frowning Mac face lets you know that it's confused. Short of resetting, you won't be able to recover from this situation, so go ahead and do it. Afterwards, you can load in any disk you want and go on with business. If you'd like to experiment with the possibilities for damage, just be sure to use a replaceable disk.

If you've come across any items or hints that will simplify using the Macintosh, send them in, and they may appear in this column. Address submissions to me at P.O. Box 1010A, Fort Lee, NJ 07024. ✚

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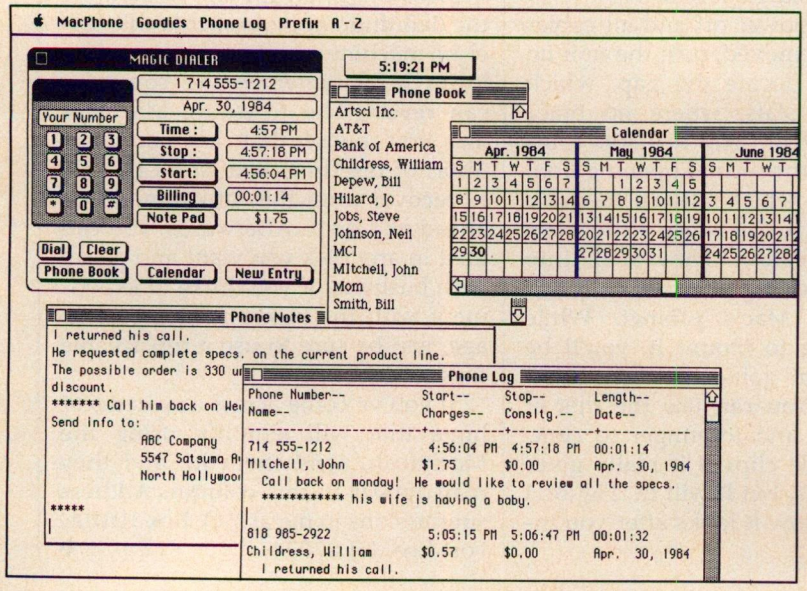

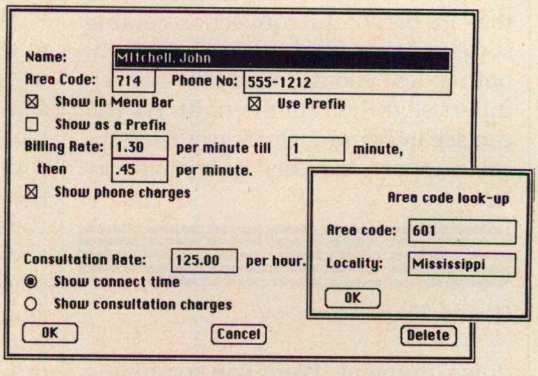

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CIRCLE 109 ON READER SERVICE CARD

Our First Peek Inside the Mac

Laying the groundwork for programmers

Each column I write seems to get the same response: "That was a good column you wrote last month, but when are you going to tell us how to program the Mac?"

I wish it were so easy.

You see, the Macintosh "user interface" has its advantages and disadvantages.

On the plus side, the intense use of graphics makes it easy for program *users* to understand the Mac. To paraphrase an old adage, "An icon is worth a thousand filenames." In addition, each item has its place on the Mac screen, so users know what to expect. The mouse makes moving and selecting items much more intuitive than operating systems (such as CP/M or MS-DOS) which you operate with command lines. Last, the "what you see is what you get" approach of most Mac software is an improvement for those of us who have always led paper-oriented lives.

The drawbacks of the Mac interface primarily affect programmers. Although you have 64K of prewritten ROM code, understanding how these routines interrelate takes a lot of study. Also, the user interface takes a large chunk of the Mac's 128K of RAM: 21K for the display and 16K for tables and the system heap, or even more, depending upon which resources you're using.

How about High-Level Languages?

The natural inclination of many computer programmers is to turn to high-level languages to simplify their chores. The first high-level language for the Macintosh was Microsoft BASIC.

Microsoft BASIC is a disappointment to me. First, for all the computing power inside the Mac, Microsoft BASIC is slow. Second, I keep finding small bugs that get in the way of my programs. True, some of these bugs are inconsequential, such as the one in which TRACE doesn't tell you when control has returned after a GOSUB to the second statement on a line. My impression is that Microsoft rushed its BASIC to market—it does not perform as well as it should.

More important to programmers, however, are the Mac interface commands that Microsoft BASIC makes available to users. Of the more than 130 QuickDraw routines in the Mac's ROM, Microsoft BASIC uses only 41 of these routines, and the language doesn't offer any of the other 400+ ROM routines.

The predefined CALLs in Microsoft BASIC are drawing-oriented commands, as opposed to operating-system ones. Although most of the pen, text, rectangle, oval, and rounded-rectangle commands are available, none of the GrafPort initialization, region calculation, polygon, point, or transfer routines are. Thus, you cannot open a window that takes up a whole screen, scroll sections of graphics easily, make copies of regions, move icons, deal with files, and so on.

Let's look at how to use a few CALLs in Microsoft BASIC. We'll draw a simple rectangle in our example; other QuickDraw functions work similarly.

First, before we draw anything, we need to get our pen ready. The two most important attributes to most of us will be the size of the pen and the pattern that the pen draws. Fortunately, QuickDraw (and Microsoft BASIC) names clearly represent what intended commands do. PenSize controls pen size, PenPat controls the pen pattern, and so on.

Microsoft uses several special variable names to store information QuickDraw needs to know.

RECTANGLE%(0)	upper left y position
RECTANGLE%(1)	upper left x position
RECTANGLE%(2)	lower right y position
RECTANGLE%(3)	lower right x position
PATTERN%(0)	top two lines of 8 × 8 pattern
PATTERN%(1)	second two lines of 8 × 8 pattern
PATTERN%(2)	third two lines of 8 × 8 pattern
PATTERN%(3)	last two lines of 8 × 8 pattern

Note that each element of the PATTERN% array consists of 16 bits of information. Coordinates in the QuickDraw world start at 0,0 in the upper left-hand corner of the screen

and must be integers. Figures 1 and 2 show a rectangle I produced in Microsoft BASIC with two pen sizes, one of the default size (one is in both the horizontal and vertical axes) and the other with a pen size of five in each direction.

Figure 3 takes our simple example one step further. I used an 8 × 8-dot pen with an alternating bit pattern, making a "gray"-bordered rectangle.

Such drawing abilities are nice, but Microsoft BASIC doesn't really get us closer to being able to "make Mac magic." To *really* program the Mac, you need to understand and use each of those 400+ ROM routines.

Our first task in learning to make Mac magic is to be familiar with the various components of the operating system, what each does, and how they interrelate. Unfortunately for long-time computer users, almost all of the terminology Apple uses is going to be new.

You'll recognize some of the terms from reading the Macintosh manuals: *pull-down menus, menu bars, windows, icons,* and so on. I'll assume that you're familiar with these and proceed with a rundown of the terms Apple didn't describe in the Mac manual.

First we have the Finder, which most of us would call the operating system. It is the mastermind that controls loading and execution of programs and the desk accessories and makes calls to other, lower-level "tools" (routines).

Within the Finder, we find several "managers," each of which controls one aspect of the Macintosh user interface. At the highest level is the Dialog Manager, which, appropriately enough, handles the dialog boxes that pop up at various times, such as when you insert an unformatted diskette.

A dialog box has several parts (a window, some text, possibly icons, click-on boxes, and so on), thus it makes calls to other even lower-level managers within the Macintosh's software.

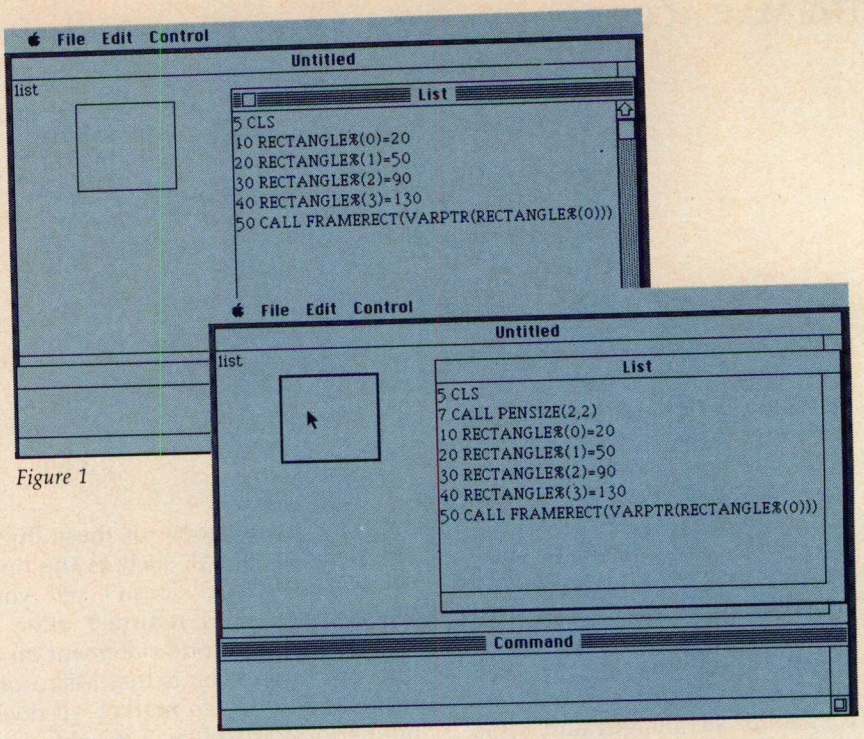

Figure 1

Figure 2

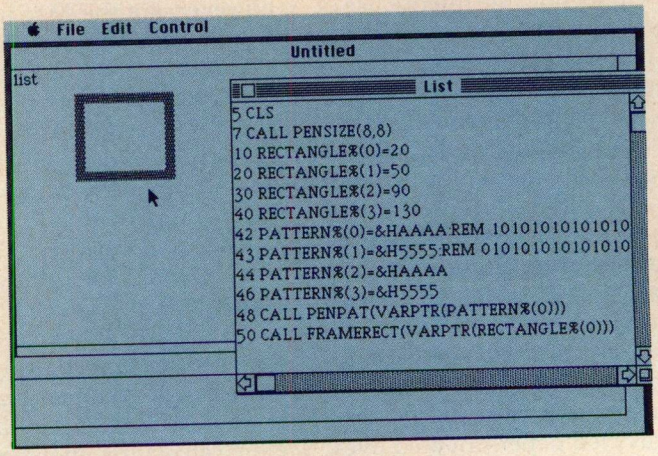

Figure 3

For example, we have TextEdit and CoreEdit, two routines that handle text input and editing. TextEdit resides in ROM and performs the basic text-editing chores you might expect from a word processor: deleting, inserting, working with blocks of text, and so on. CoreEdit is in RAM and adds more advanced features to TextEdit. These two text-handling routines are one reason that almost all data-entry routines on the Macintosh feature the same abilities that resemble those of a word processor.

Below TextEdit and CoreEdit in priority come several other managers. The Control Manager and Menu Manager have the highest-level priority of these managers. The Control Manager controls controls, if you will—that sounds more confusing than it is. In Mac terminology, buttons, check boxes, and scroll bars are all called "controls," and the Control Manager runs them.

The Menu Manager is responsible for those pull-down menus you see on the Mac's top line. Besides handling the naming chores for each menu item, the Menu Manager also detects check marks for selected options and takes the appropriate actions (as in the font menus of MacPaint), highlights the chosen item, and sets up equivalent option-key sequences, if you need them.

Many of the functional areas we've already talked about invoke the next of our managers, the Window Manager, which creates and manipulates the Mac's windowing scheme. (By the way, the Mac's windows need not be rectangular, although that shape is the easiest to work with.)

The Window Manager also moves windows from place to place when you "drag" the window with the mouse. Fortunately, the Window Manager can handle multiple windows, redrawing them as necessary when you move them around or select a different one to be the topmost on the desktop.

As we get to the lowest levels of the operating-system hierarchy, we begin to discover the routines that do the real grunt work for programmers. The Toolbox Utilities contain some miscellaneous routines that we can't really classify into one of the other managers.

The Event Manager concerns itself with the keyboard and the mouse. The following actions qualify as "events" in the Mac's world: pressing a key, releasing a key, moving the mouse, pressing the mouse button, releasing the mouse button, and inserting a disk. The Event Manager records the time any of these events occurs (in 1/60 second increments). It also reports the mouse's position and the status of several important keys (Shift, Caps Lock, and so on). The Mac's ROM are particularly suited to programs such as typing tutorials, since they give the programs a wealth of information to work from. The Event Manager is misnamed—Event Reporter would have been a more accurate designation.

I've already briefly mentioned the QuickDraw routines, which almost everything you see on the Mac's display has gone through. The Mac's speed in updating the display is inherently linked to the brevity of these machine-language routines. You don't have to analyze Bill Atkinson's work carefully to appreciate it; the results are there on the screen. Lest you think that the Macintosh's software design is fixed in monochrome, you should know that QuickDraw has routines for manipulating color graphics. I don't mean to imply that the Mac will eventually have color, but its user interface does have a life after black and white.

To create a new version of the program for another language, you only have to change the message file.

Next we look at the Font Manager, which handles the way text appears on the Macintosh screen. Unlike other computers, however, the Mac makes no distinction between text and graphics "modes" of display. The Mac's Font Manager actually draws text on the screen. This ability promises some potential for Mac that even Apple has apparently yet to pursue. Since fonts are nothing more than patterns, the implications for complex character-oriented animation on the Macintosh are striking. Remember, you can make fonts bold, decrease or increase their size, and change them to outline style.

The last of our Macintosh managers is the Resource Manager. Others have written that the Resource Manager is like a librarian, and I believe that this is an apt analogy. The Mac's library is in immaculate shape—menus, icons, fonts, dialog boxes, and even program code are all stored on disk as a resource.

The Resource Manager's job is to make sure that the correct resources are available when required and to shuffle everything between disk and memory as needed. One aspect of the Mac's programming that relies upon the Resource Manager is the foreign-language versions of the software. Apple has designed its programs so that all messages appear in resource files that are separate from actual program code, meaning that to create a new version of the program for another language, you only have to change the message file. Imagine a terminal-emulation program that uses different resource files to configure itself as different terminals. Such a program is quite possible and may show up soon at your local Apple dealer.

Conspicuously missing from the managerial staff of the Macintosh is a Sound Manager to use the Mac's built-in sound system. After hearing the Mac talk, I am surprised that Apple chose not to add sound to the operating system. Perhaps this capability required too much memory, perhaps we'll see some additional managers when 512K Macs become available, or perhaps Apple is saving Mac's speaking abilities for the machine's more "mature" years.

Play Ball

OK, now that you've met the players, let's see if we can put together a simple sample of how to use the roster. For now, we'll content ourselves with pretending to program the Mac in assembly language. As I write this column, I need at least a Lisa 2/5 with one megabyte of memory to do my software-development work. Therefore, this month I'll "talk" you through some assembly-language code.

Maybe by the next column, I'll have a copy of the Mac assembler and I'll be able to start showing you how to program the Mac directly.

First and foremost, you need to know that you never access the ROM routines directly. Instead, you use what Apple refers to as "The Trap Mechanism."

When Motorola designed the 68000 chip, it left the op codes beginning with the bit pattern 1010 (0A hex) out of the instruction set. When the processor encounters an instruction that begins with 1010, it recognizes that as an "unimplemented instruction" and proceeds to examine the remaining 12 bits of the op code word to determine what unimplemented instruction is desired. The processor uses a routine in low memory called the Trap Dispatcher to determine this information and, based on what it finds, it executes instructions at another memory location.

Apple's way of using this "trap" instruction gives programmers access to all the ROM routines via pseudo-op codes. The least significant seven or eight bits of the op code indicate which ROM routine you're requesting. You have to make sure that appropriate values (for parameters to be passed to the ROM routines) are al-

ready on the stack.

Apple designed the ROM routines as macros (each begins with an underscore to indicate that it is a trap macro), using the names of the ROM routines. For example, you use the PenSize routine we looked at in Microsoft BASIC earlier in this column this way in assembly language:

```
MOVE.W #1,-(SP)  :push width of 1
MOVE.W #2,-(SP)  ;push height of 2
_PENSIZE         ;execute PenSize
                 routine
```

The first two instructions move two 16-bit integer values to the stack for use by the PenSize routine. Apple's strong orientation toward Pascal shows in Macintosh assembly-language programming requirements. Lisa Pascal pushes procedure parameters onto the stack in the order they're encountered in a statement. For example, FillRect(myRect,1,thePort^.pnSize.v,white); is the Lisa Pascal equivalent to the following assembly language:

```
PEA      MYRECT
MOVE.W   #1,-(SP)
MOVE.L   GRAFGLOB(A5),AO
MOVE.L   THEPORT(AO),A1
MOVE.W   PNSIZE+V(A1),-(SP)
PEA      WHITE(AO)
_FILLRECT
```

If you're not sure what all of this means, you can feel better knowing that few people do right now. The left column contains assembly-language mnemonics for 68000 op codes (including Apple's _FILLRECT pseudo-op code). The right column consists of arguments (called "operands" in assembly-language parlance) for the corresponding op code. MYRECT, GRAFGLOB, THEPORT, PNSIZE, and WHITE are all names for predefined values. Actually, this assembly-language fragment is similar to our last one. It sets up the stack with some values for _FILLRECT and places other values in some of the predefined variable locations in the Macintosh.

I *strongly* suggest that you get acquainted with both Pascal and 68000 machine language. Pascal books abound; one that I really like that is a bit difficult to find these days is *Programming for Poets: A Gentle Introduction Using Pascal* by Richard Conway, James Archer, and Ralph Conway, published by Winthrop Publishers.

On the assembly-language side, two helpful books are *68000 Assembly Language Programming* by Gerry Kane, Doug Hawkins, and Lance Leventhal, published by Osborne/McGraw-Hill, and *Programming the M68000*, by Tim King and Brian Knight, published by Micro Computer Books (Addison-Wesley). +

Portions of this month's column were extracted from Thom Hogan's Within Macintosh, *to be published this fall by Brady Books (Prentice-Hall) and copyright 1984 by Thom Hogan.*

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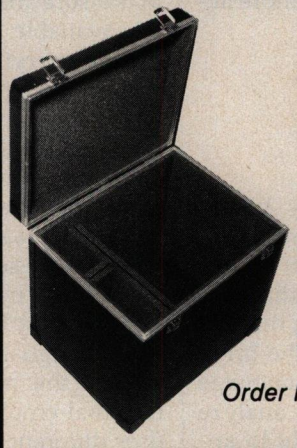

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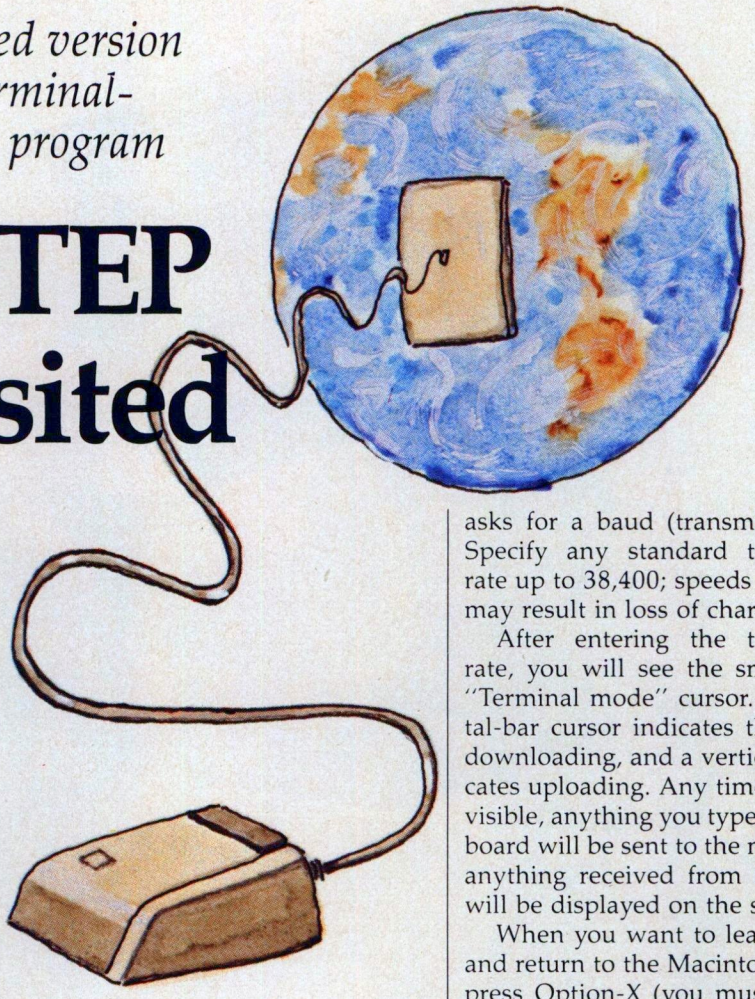
An improved version of the terminal-emulation program

MacTEP Revisited



Sorry, folks. The program listing of MacTEP on pages 94 and 95 of the May issue of A+ was printed incorrectly. Because our June issue had a special report on the new Apple IIc, we weren't able to follow up on the MacTEP program until now. To make up for the incorrect program listing, we have made special arrangements to bring you this updated, correct version of MacTEP.

The problem with the listing in the May issue occurred during the typesetting process, and it managed to evade our attention until it was too late to fix it. When we transmitted the program listing directly from a disk to a typesetting machine, the typesetting machine unfortunately changed all the left angle brackets (<) to carriage returns. This gremlin thus deleted all the left angle brackets and also split several lines where they shouldn't have been split. The lines affected were 3060, 3080, 5050, 5060, 5140, 5210, 6080, 6090, 6180, 6230, and 9080. Each of these program lines should have had a left angle bracket wherever the line split.

For example, line 5210 should read:

```
5210 IF C$ <>CMDB$ AND
     C$ <>CMDR$ THEN 5250
```

We're very sorry about any inconvenience or headaches this muddle may have caused you, so we asked Dennis Brothers, the author of MacTEP, to enhance the program with some valuable new features.

We are printing it here (without typos!) for your use. Brothers provides some comments about the MacTEP program and generously offers to provide you the MacTEP program on disk for a nominal handling charge of $5. Here are Dennis' comments and the enhanced version of the program:

This new version of MacTEP, a Macintosh terminal-emulation program written in Microsoft BASIC, offers improvements over earlier versions. This version performs much better at high speeds (9600 bps or better), lets you create true MacWrite and MS-BASIC documents when downloading, enables you to download to the printer, and gives you a cursor whose shape indicates the current mode.

Using MacTEP

You can execute MacTEP by double-clicking on its icon (MS-BASIC must be on one of the mounted disks). If you get an Out of Memory message when trying to run MacTEP, you probably have something large in your clipboard—try copying something small from the desktop and then running MacTEP again.

Once MacTEP begins to execute, it asks for a baud (transmission) rate. Specify any standard transmission rate up to 38,400; speeds above 9600 may result in loss of characters.

After entering the transmission rate, you will see the small, square "Terminal mode" cursor. A horizontal-bar cursor indicates that you are downloading, and a vertical bar indicates uploading. Any time a cursor is visible, anything you type on the keyboard will be sent to the modem, and anything received from the modem will be displayed on the screen.

When you want to leave MacTEP and return to the Macintosh desktop, press Option-X (you must be in the plain Terminal mode, not in Uploading or Downloading, to do so).

To start downloading (receiving data or text from a remote system on a disk file, the printer, or the clipboard), press Option-R (to download a text file as a MacWrite document) or Option-B (to download a BASIC program). MacTEP will ask for a filename. You can change your mind and cancel the download by typing a Return at this point. Otherwise, type the name you want to give the downloaded file. The letter P stands for the printer, and C means the clipboard. After you begin downloading, everything you receive from the remote system goes to the specified file (or printer or clipboard), and appears on the screen. When you have received everything you want to capture, press Option-R or Option-B again.

To send a file to a remote system (upload), press Option-T. The program will ask you for a filename, and after you enter it, the contents of that file (or the clipboard, if you enter C as the filename) will be sent to the re-

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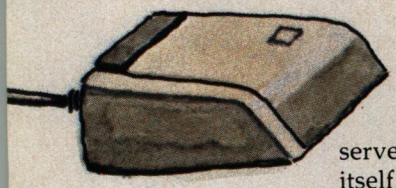
mote system, as though you had typed it on the keyboard.

Send only text files (such as MacWrite documents saved with text only or MS-BASIC programs saved in ASCII format) with this version of MacTEP—other types of files may confuse the remote system.

If you need to send a Control-C to your remote system, use the Enter key—a CMD-C will interrupt MacTEP and bounce you back into the BASIC mode.



Because MacTEP reserves a large amount of memory for itself, trying to use the desk accessories may cause a system error.

When you're downloading to the clipboard, commas will change to tabs. The reverse happens when you upload from the clipboard. See my column in last month's *A+* (page 129) for more information.

After successfully running MacTEP at least once, you can speed up the initialization process by deleting lines 6470 through 6510—they are only for verifying the accuracy of the machine-language DATA statements.

The latest version of MacTEP will generally be available through CompuServe, in the ACCESS database (section XA4) of the Micronet Apple User's Group (MAUG). After logging into CompuServe, type GO PCS51 to get to MAUG.

New versions of MacTEP will also propagate on other bulletin boards around the country, as MAUG members (and others) pass it around.

If you can't find MacTEP anywhere else, send a blank Macintosh disk, with a stamped, self-addressed return mailer and a check for $5 to:

MacTEP Offer
Brothers Associates
197 Old Connecticut Path
Wayland, MA 01778

Your disk will come back to you containing a copy of the latest Microsoft BASIC version of MacTEP.

```
1000 CALL TEXTSIZE(9): CALL TEXTFONT(4)  '  Use 9-point Monaco
1010 CLS: PRINT
1020 PRINT "   MacTEP - Macintosh Terminal Emulator Program"
1030 PRINT
1040 PRINT "   Version 1.86 - 22 April, 1984"
1050 PRINT "   Dennis F. Brothers - Compuserve 70065,172 - MCI Mail DBROTHERS"
1051 PRINT
1052 PRINT "   +++   SPECIAL VERSION FOR A+ MAGAZINE   +++"
1060 PRINT
1070 PRINT "   Copyright (c) 1984 - Brothers Associates, Wayland MA"
1080 PRINT "   Permission is hereby granted for personal, non-commercial"
1090 PRINT "   reproduction and use of this program, provided that this"
1100 PRINT "   notice is included in any copy."
1110 PRINT: PRINT
1120 PRINT "   Option-R starts and stops ASCII receive (download)."
1130 PRINT "   Option-B starts and stops ASCII BASIC receive"
1140 PRINT "            (lines not beginning with a digit are ignored)."
1150 PRINT "   Option-T starts and stops ASCII transmit (upload)."
1160 PRINT "   Option-X exits to the Macintosh desktop."
1170 PRINT: PRINT
1180 PRINT "   Initializing - Please wait....."
1190 PRINT: PRINT
1200 REM
1210 CLEAR ,25000: REM  Allocate extra memory
1220 DEFINT A-Z: REM  Default to integers for speed
1230 REM
1240 GOSUB 5000: REM  Define constants
1250 GOSUB 6000: REM  Allocate variables
1260 GOSUB 7000: REM  Initialize communication port
1270 REM
1280 PRINT: PRINT
1290 CALL PENNORMAL: CALL SHOWPEN: CALL PENMODE(10)  '  Prepare for cursor
1300 REM
2000 REM   Terminal Mode
2010 REM
2020 ON ERROR GOTO 0  '  Make sure error trapping is normal
2030 CALL PENSIZE(4,1)  '  Terminal mode cursor is square
2040 XFLAG=FALSE  '  No X-OFF outstanding
2050 CALL LINE(0,-4)  '  Draw the cursor
2060 IF LOC(1)=0 THEN GOTO 2120  '  No receive characters waiting
2070    IF LOC(1)>BUFLIM AND NOT XFLAG THEN PRINT #1,XOFF$;: XFLAG=TRUE
2080    L$=INPUT$(LOC(1),#1)  '  Input all waiting characters
2090    CALL TRANSLATE!(XTABLE!,LP!,TLP!)  '  Strip and translate
2100    IF TL<>0 THEN CALL LINE(0,4): PRINT LEFT$(L$,TL);: CALL LINE(0,-4)
2110    IF XFLAG THEN XFLAG=FALSE: PRINT #1,XON$;  '  turn the remote back on
2120 C$=INKEY$  '  Has user struck a key?
2130 IF C$="" THEN GOTO 2060  '  No
2140 IF C$=OPTB$ OR C$=SHOPTB$ THEN CALL LINE(0,4): BASIC=TRUE : GOTO 3000
2150 IF C$=OPTR$ OR C$=SHOPTR$ THEN CALL LINE(0,4): BASIC=FALSE: GOTO 3000
2160 IF C$=OPTT$ OR C$=SHOPTT$ THEN CALL LINE(0,4): GOTO 4000
2170 IF C$<>OPTX$ AND C$<>SHOPTX$ THEN PRINT #1,C$;: GOTO 2060  '  Send key char
2180 CALL LINE(0,4): PRINT: PRINT "Exiting...": SYSTEM
2190 REM
3000 REM Receive (download) ASCII File or BASIC program
3010 REM
3020 CALL PENSIZE(6,1)  '  Download cursor is a horizontal bar
3030 XFLAG=FALSE: CRFLAG=TRUE: FLUSH=FALSE  '  Initialize logical flags
3040 PRINT: LINE INPUT "Receive File Name: ",F$
3050 IF F$="" THEN GOTO 2000  '  No file name - go back to terminal mode
3060 IF F$="C" OR F$="c" THEN F$="CLIP:"  '  User wants the Clipboard
3070 IF F$="P" OR F$="p" THEN F$="LPT1:"  '  The Imagewriter
3080 OPEN F$ FOR OUTPUT AS #2: WIDTH #2,255  '  Open the receive file or device
3090 IF F$<>"LPT1:" AND F$<>"lpt1:" THEN GOTO 3110
3100    PRINT #2,ESC$;"D";CHR$(128);CHR$(0);  '  Set printer for auto-linefeed
3110 CALL LINE(0,-2)  '  Draw the cursor
3120 QUIT=FALSE  '  Initialize termination flag
3130 WHILE NOT QUIT  '  Do until receive ends
3140    IF LOC(1)=0 THEN GOTO 3260  '  No receive characters available
3150       IF LOC(1)>BUFLIM AND NOT XFLAG THEN PRINT #1,XOFF$;: XFLAG=TRUE
3160       L$=INPUT$(LOC(1),#1)  '  Get all available receive characters
3170       CALL TRANSLATE!(XTABLE!,LP!,TLP!)  '  Translate and strip
3180       IF TL=0 THEN GOTO 3250  '  None left after stripping
3190          CALL LINE(0,2): PRINT LEFT$(L$,TL);: CALL LINE(0,-2)
3200          IF NOT BASIC THEN GOTO 3230  '  Straight ASCII
3210             CALL BPROC!(LP!,TLP!,CRFLAGP!,FLUSHP!)  '  Kill non-BASIC lines
3220             IF TL=0 THEN GOTO 3250  '  Nothing left after processing
3230          IF LOC(1)>BUFLIM AND NOT XFLAG THEN PRINT #1,XOFF$;: XFLAG=TRUE
3240          PRINT #2,LEFT$(L$,TL);  '  Send received chars to file or device
3250       IF XFLAG THEN XFLAG=FALSE: PRINT #1,XON$;  '  X-ON if needed
3260    C$=INKEY$  '  Anything from keyboard?
3270    IF C$="" THEN GOTO 3310  '  No
3280    IF C$=OPTB$ OR C$=SHOPTB$ THEN QUIT=TRUE: GOTO 3310
3290    IF C$=OPTR$ OR C$=SHOPTR$ THEN QUIT=TRUE: GOTO 3310
3300    PRINT #1,C$;  '  Send keyed character to remote
3310    WEND  '  Keep looping until user says quit
3320 CALL LINE(0,2)  '  Erase the cursor
3330 IF F$<>"LPT1:" AND F$<>"lpt1:" THEN GOTO 3350
3340    PRINT #2,ESC$;"Z";CHR$(128);CHR$(0);  '  Restore printer to normal
3350 CLOSE #2  '  Done outputting to file or device
3360 IF RIGHT$(F$,1)=":" THEN GOTO 3390  '  Not file - skip document change
3370    IF BASIC THEN TYPEAPPL$="MSBAMSBA" ELSE TYPEAPPL$="TEXTMACA"
3380    GOSUB 8000  '  Change file to MS BASIC or MacWrite document
3390 PRINT: PRINT "Receive Ended": PRINT
3400 GOTO 2000  '  Go back to terminal mode
3410 REM
4000 REM Transmit (upload) ASCII file
4010 REM
4020 CALL PENSIZE(2,1)  '  Upload cursor is vertical bar
4030 XFLAG=FALSE  '  No outstanding X-OFF
4040 PRINT: LINE INPUT "Transmit File Name: ",F$
4050 IF F$="" THEN GOTO 2000  '  No filename - go back to terminal mode
4060 IF F$="C" OR F$="c" THEN F$="CLIP:"  '  User wants to transmit clipboard
4070 ON ERROR GOTO 4340  '  So we can handle "File not found"
```

```
4080 OPEN F$ FOR INPUT AS #2  '  Open the file to be transmitted
4090 ON ERROR GOTO 0  '  Error trapping back to normal
4100 CALL LINE(0,-6)  '  Draw the cursor
4110 QUIT=FALSE  '  Initialize termination flag
4120 WHILE NOT (EOF(2) OR QUIT)  '  Repeat until end of file or user says quit
4130    IF LOC(1)<>0 THEN GOTO 4180  '  Outstanding receive chars - skip send
4140    LINE INPUT #2,XL$  '  Read next line of transmit file
4150    IF XL$<>"" THEN FOR I=1 TO LEN(XL$): PRINT #1,MID$(XL$,I,1);: NEXT I
4160    PRINT #1,CR$;  '  Transmit end-of-line
4170    IF LOC(1)=0 THEN GOTO 4230  '  No received characters to process
4180       IF LOC(1)>BUFLIM AND NOT XFLAG THEN PRINT #1,XOFF$;: XFLAG=TRUE
4190       L$=INPUT$(LOC(1),#1)  '  Input all outstanding receive characters
4200       CALL TRANSLATE!(XTABLE!,LP!,TLP!)  '  Strip and translate
4210       IF TL<>0 THEN CALL LINE(0,6): PRINT LEFT$(L$,TL);: CALL LINE(0,-6)
4220       IF XFLAG THEN XFLAG=FALSE: PRINT #1,XON$;  '  X-ON if needed
4230    C$=INKEY$  '  Anything from keyboard?
4240    IF C$="" THEN GOTO 4270  '  No
4250    IF C$=OPTT$ OR C$=SHOPTT$ THEN QUIT=TRUE: GOTO 4280  '  User says quit
4260    PRINT #1,C$;  '  Send keyboard character to remote
4270    IF LOC(1)<>0 THEN GOTO 4180  '  If any received chars, go process
4280    WEND  '  Otherwise, go try to transmit some more
4290 CALL LINE(0,6)  '  Erase the cursor
4300 CLOSE #2  '  Done with transmit file
4310 PRINT: PRINT "Transmit Ended": PRINT
4320 GOTO 2000  '  Go back to terminal mode
4330 REM
4340 PRINT: PRINT "Couldn't open file - returning to terminal mode.": PRINT
4350 RESUME 2000
4360 REM
5000 REM    Define constants
5010 REM
5020 BUFFERSIZE=4096  '  Buffer is used to hold received characters
5030 BUFLIM=BUFFERSIZE\4  '  How full to let buffer get before pausing remote
5040 REM
5050 FALSE=0: TRUE=-1  '  Logical values recognized in IF statements
5060 REM
5070 LF=10: LF$=CHR$(LF)           '  Standard ASCII control characters
5080 CR=13: CR$=CHR$(CR)
5090 XON=17: XON$=CHR$(XON)
5100 XOFF=19: XOFF$=CHR$(XOFF)
5110 ESC=27: ESC$=CHR$(ESC)
5120 REM
5130 OPTB$=CHR$(186): SHOPTB$=CHR$(245) ' Option-command characters, & shifted
5140 OPTR$=CHR$(168): SHOPTR$=CHR$(229)
5150 OPTT$=CHR$(160): SHOPTT$=CHR$(230)
5160 OPTX$=CHR$(197): SHOPTX$=CHR$(244)
5170 REM
5180 AIN=-6: AOUT=-7  '  Reference numbers for serial input and output ports
5190 SB1=&H4000: SB15=&H8000: SB2=&HC000'  Stop bit parameter values
5200 PARNONE=&H0: PARODD=&H1000: PAREVEN=&H3000'  Parity parameter values
5210 DB5=&H0: DB6=&H800: DB7=&H400: DB8=&HC00'  Bits-per-character param values
5220 REM
5230 RETURN
5240 REM
6000 REM  Pre-allocate all variables so arrays don't move
6010 REM  IMPORTANT THAT ALL VARIABLES BE REFERENCED BEFORE POINTERS SET
6020 REM
6030 DIM MLCODEARRAY(199)  '  Array to hold machine-language subroutines
6040 DIM XTABLEARRAY(127)  '  Array to hold receive translate table
6050 DIM BUFFERARRAY(BUFFERSIZE/2)  '  Buffer for received characters
6060 DIM PARAMLIST(39)  '  Parameter list for serial driver Control ROM calls
6070 I=0: MLLINE=0: MLCHK=0: MLL=0: MLS=0: ML$=""  '  Used in setting up M.L.
6080 TL=0  '  Length of translated receive string
6090 BR!=0: TC=0  '  Baud rate and time constant
6100 L$="": LP!=0: C$="": XL$=""  '  Used for transmit and receive text
6110 F$="": FL=0: FP!=0  '  File name and pointer to it
6120 TYPEAPPL$=""  '  Type and parent application of received document
6130 BASIC=FALSE: XFLAG=FALSE  '  Logical variables (flags)
6140 CRFLAG=FALSE: FLUSH=FALSE
6150 C=0  '  Miscellaneous character value
6160 QUIT=0  '  Upload/download termination flag
6170 REM
6180 MLCODE!=0  '  Pointer to machine-language array
6190 CONTROL!=0  '  Address of Control ROM call ML subroutine
6200 TRANSLATE!=0  '  Address of translate ML subroutine
6210 BPROC!=0  '  Address of BASIC receive processing ML subroutine
6220 GETFILEINFO!=0  '  Address of GetFileInfo ROM call ML subroutine
6230 SETFILEINFO!=0  '  Address of SetFileInfo ROM call ML subroutine
6240 XTABLE!=0  '  Pointer to translate table
6250 BUFFER!=0: BUFFERT!=0: BUFFERH=0: BUFFERL=0  '  Pointer to buffer, hi & lo
6260 PARAM!=0  '  Pointer to Control ROM call parameter list
6270 TLP!=0: CRFLAGP!=0: FLUSHP!=0  '  Pointers to vars for TRANSLATE & BPROC
6280 REM
6290 REM  Set up all pointers
6300 REM     NO NEW VARIABLES MAY BE USED AFTER THIS POINT IN TIME!!!
6310 MLCODE!=VARPTR(MLCODEARRAY(0))
6320 XTABLE!=VARPTR(XTABLEARRAY(0))
6330 BUFFER!=VARPTR(BUFFERARRAY(0))
6340 BUFFERH=INT(BUFFER!/65536!): BUFFERT!=BUFFER!-(BUFFERH*65536!)
6350 IF BUFFERT!<32768! THEN BUFFERL=BUFFERT! ELSE BUFFERL=BUFFERT!-65536!
6360 PARAM!=VARPTR(PARAMLIST(0))
6370 LP!=VARPTR(L$): FP!=VARPTR(F$)
6380 TLP!=VARPTR(TL)
6390 CRFLAGP!=VARPTR(CRFLAG)
6400 FLUSHP!=VARPTR(FLUSH)
6410 REM
6420 REM  Initialize the machine language subroutines
6430 REM
6440 RESTORE 9020  '  Restore to machine-language HEX data statements
6450 MLLINE=9020  '  First DATA statement line number
6460 READ ML$  '  Read next line of HEX data
6470 MLCHK=0  '  Initialize checksum
6480 FOR I=1 TO LEN(ML$)-1 STEP 2  '  Scan by bytes (pairs of hex digits)
6490 MLCHK=(MLCHK+VAL("&H"+MID$(ML$,I,2))) MOD &H100  '  Compute checksum
6500 NEXT I
6510 IF MLCHK<>0 THEN CLS: PRINT CHR$(7);"Error in ML line ";MLLINE: STOP
6520 MLL=VAL("&H"+MID$(ML$,3,2)+MID$(ML$,1,2))     Get byte count of ML string
6530 MLS=VAL("&H"+MID$(ML$,7,2)+MID$(ML$,5,2))     Get start addr of ML string
6540 IF MLL=0 THEN GOTO 6610  '  Zero byte count ends ML data
6550 FOR I=0 TO MLL-1
6560 POKE MLCODE!+MLS+I,VAL("&H"+MID$(ML$,9+I*2,2))  '  Put ML data in array
6570 NEXT I
6580 MLLINE=MLLINE+10  '  Keep track of DATA line number, in case of error
6590 GOTO 6460
6600 REM  Set up CALL address pointers - offsets are at beginning of array
6610 CONTROL!=MLCODE!+MLCODEARRAY(0)
6620 TRANSLATE!=MLCODE!+MLCODEARRAY(1)
6630 BPROC!=MLCODE!+MLCODEARRAY(2)
6640 GETFILEINFO!=MLCODE!+MLCODEARRAY(3)
6650 SETFILEINFO!=MLCODE!+MLCODEARRAY(4)
6660 REM
6670 REM  Initialize the character translation table
6680 REM    256-byte table contains translated value for
6690 REM       each possible received character value
6700 REM       - characters which translate to zero are ignored (stripped)
6710 REM
6720 FOR I=0 TO 255:POKE XTABLE!+I,0:NEXT I  '  Initialize to all zeroes
6730 FOR I=7 TO 13
6740 POKE XTABLE!+I,I: POKE XTABLE!+128+I,I  '  Put standard control chars in
6750 NEXT I
6760 POKE XTABLE!+10,0: POKE XTABLE!+128+10,0  '  Take linefeed out
6770 FOR I=32 TO 126
6780 POKE XTABLE!+I,I: POKE XTABLE!+128+I,I  '  Put printing characters in
6790 NEXT I
6800 REM
6810 RETURN
6820 REM
7000 REM  OPEN and set up the COM1 port
7010 REM
7020 OPEN "COM1:" AS #1 LEN=BUFFERSIZE
7030 WIDTH #1,255  '  We don't want BASIC inserting extraneous carriage returns
7040 REM
7050 INPUT "Baud rate: ", BR!: TC=INT((115200!/BR!)+.5)-2  '  Set time constant
7060 IF BR!<1200 THEN WIDTH 81 ELSE WIDTH 255  '  At low speed, let BASIC wrap
7070 REM
7080 FOR I=0 TO 49\2: PARAMLIST(I)=0: NEXT I
7090 PARAMLIST(24\2)=AIN
7100 PARAMLIST(26\2)=8
7110 PARAMLIST(28\2)=SB1+PARNONE+DB8+TC  '  Stop bits, parity, char length
7120 CALL CONTROL!(PARAM!)  '  Set comm port parameters
7130 REM
7140 FOR I=0 TO 49\2: PARAMLIST(I)=0: NEXT I
7150 PARAMLIST(24\2)=AIN
7160 PARAMLIST(26\2)=9
7170 PARAMLIST(28\2)=BUFFERH
7180 PARAMLIST(30\2)=BUFFERL
7190 PARAMLIST(32\2)=BUFFERSIZE
7200 CALL CONTROL!(PARAM!)  '  Tell Mac to use our (huge) input buffer
7210 REM
7220 FOR I=0 TO 49\2: PARAMLIST(I)=0: NEXT I
7230 PARAMLIST(24\2)=AIN
7240 PARAMLIST(26\2)=10
7250 POKE PARAM!+28,1  '  enable XON/XOFF output handshake
7260 POKE PARAM!+29,0  '  disable CTS output handshake
7270 POKE PARAM!+30,XON  '  X-ON handshake character
7280 POKE PARAM!+31,XOFF  '  X-OFF handshake character
7290 POKE PARAM!+32,0  '  no aborts
7300 POKE PARAM!+33,0  '  no events
7310 POKE PARAM!+34,0  '  disable XON/XOFF input flow control (does not work)
7320 CALL CONTROL!(PARAM!)
7330 REM
7340 RETURN
7350 REM
8000 REM  Subroutine to set type and application of a file
8010 REM
8020 FL=LEN(F$)
8030 F$=CHR$(FL)+F$  '  Convert filename to Mac string format
8040 FOR I=0 TO 79: POKE PARAM!+I,0: NEXT I
8050 POKE PARAM!+19,PEEK(FP!+2)
8060 POKE PARAM!+20,PEEK(FP!+3)
8070 POKE PARAM!+21,PEEK(FP!+4)
8080 CALL GETFILEINFO!(PARAM!)  '  Get the file information
8090 FOR I=1 TO 8
8100 POKE PARAM!+31+I,ASC(MID$(TYPEAPPL$,I,1))  '  New type and application
8110 NEXT I
8120 CALL SETFILEINFO!(PARAM!)  '  And set the file information
8130 RETURN
8140 REM
9000 REM  HEX (Intel format) code for machine language subroutines
9010 REM
9020 DATA "1C000000000A0024007600FC01164E56FFF848EE0101FFF8206E0008A0044CEEEF"
9030 DATA "1C001C000101FFF84E5E4E754E56FFE848EE0707FFE8226E000C42811219E181BE"
9040 DATA "1C003800121948281419E1821419E18214192042248246E001042824A4167123A"
9050 DATA "1C00540042801018128000067045289528253416 6F0206E000830824CEE07074E"
9060 DATA "1C007000FFE84E5E4E754E56FFE048EE1F07FFE0206E00145480428010 18E18097"
9070 DATA "1C008C001018E1801018204022482 46E0010266E000C286E000832124282 4A416A"
9080 DATA "1C00A800674610180C00000D661A4A546708425436BC0001602E4A53662A36BC8B"
9090 DATA "1C00C400000112C0524260204A54661C4A5367120C0000306D060C0000396F069A"
9100 DATA "1C00E00038BC000160064253 12C0524253416 6BA34824CEE1F07FFE04E5E4E7596"
9110 DATA "1C00FC004E56FFF848EE0101FFF8206E0008A00C4CEE0101FFF84E5E4E754E5696"
9120 DATA "18001801FFF848EE0101FFF8206E0008A00D4CEE0101FFF84E5E4E75C4"
9130 DATA "000000000000"
9140 REM
9999 END
```

PIPELINE

New Products

BY CANDACE DE SANTIS AND JOHN NEHER

Software and hardware companies are putting their designers to work creating new versions of existing products to take advantage of the Macintosh's unique abilities. This chart is an ongoing *A+* feature to keep you abreast of what's new for the Macintosh. For further information on any of these products, please circle the corresponding number on the Reader Service Card in this issue.

COMMUNICATIONS

EDUCATION

ENTERTAINMENT

HARDWARE

PRODUCTIVITY

UTILITY

DEVELOPER	PRODUCT NAME	AVAILABLE	CARD#
Dilithium Software	PC to Mac and Back	Nov. 84	470
Logo Computer Systems	MacLogo	Nov. 84	471
Mosbysystems	TeStar	Sept. 84	472
Simon and Schuster	Typing Tutor III	Aug. 84	473
CBS Software	Murder by the Dozen	Unknown	474
Hayden Software	Sargon III	Now	475
Penguin Software	Transylvania	Now	476
	The Quest	Now	516
	The Coveted Mirror	July 84	477
Sierra On-Line	Frogger	Now	478
Sir-Tech Software	Wizardry	Fall 84	479
Kensington Microware	Maccessories	Now	480
Tecmar	Removable Winchester Cartridge	Now	481
	Telephone Modem Interface	Now	482
	IEEE 488 Interface	Now	483
Aardvark/McGraw-Hill	Professional Tax Planner	Now	484
	Estate Tax Planner	Now	485
	Personal Tax Planner	Now	486
Apple Computer	MacDraw	Now	487
	MacPaint	Now	488
	MacProject	Now	489
	MacTerm	Now	490
	MacWrite	Now	491
Applied Software Technology	VersaForm	Unknown	492
Ashton-Tate	dBASE II	Now	493
Brock Software Products	Keystroke Data Base	Now	494
	Keystroke Report Generator	Now	495
Chang Laboratories	Ledger	July 84	496
	Payables	July 84	497
	Receivables	July 84	498
	Cash Register	July 84	499
Dilithium Software	Telofacts I and II	Oct. 84	500
Dow Jones & Company	Dow Jones Spreadsheet Link	Summer 84	501
Execuware	Executive Productivity Tools	Aug. 84	502
Fox & Geller	dGRAPH	Sept. 84	503
Haba Systems	Habadex	Now	504
Hayden Software	The Calendar	Now	505
Human Edge Software	The Management Edge	Aug. 84	506
	The Negotiation Edge	Dec. 84	507
	The Sales Edge	Now	508
Living Videotext	ThinkTank	Now	509
Microsoft Corp.	Multiplan	Now	510
	Microsoft BASIC	Now	511
	Microsoft Word	Now	512
	Microsoft Chart	Now	513
	Microsoft File	Now	514
Penguin Software	The Graphics Magician	Now	515
Fox & Geller	Quickcode	Sept. 84	518
	dUTIL	Sept. 84	519

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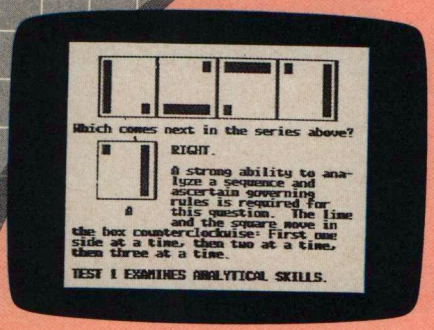

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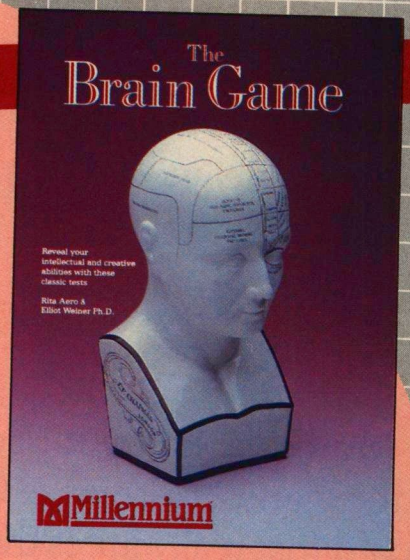

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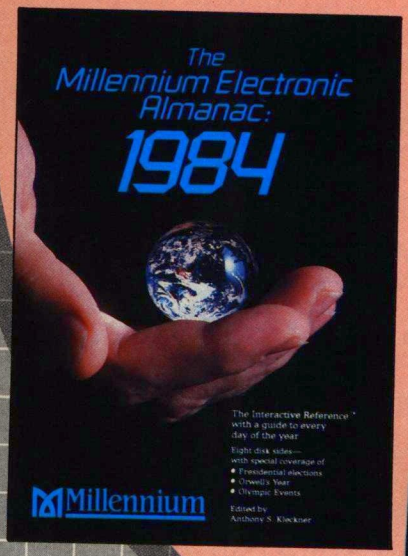

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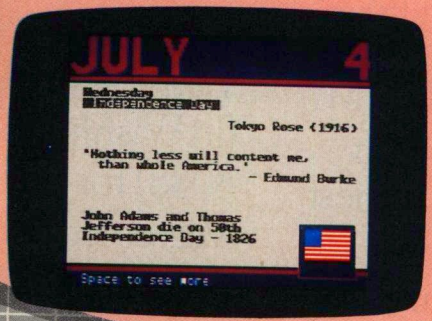

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PART TWO
HOME REPAIR GUIDE
APPLE II PLUS

Technical tables for your computer-repair efforts

This is the second installment in a three-part guide to home repair of the Apple II Plus computer. It includes a diagnostic table for the entire guide and a trouble-tree list of all the malfunctions that your computer signals with a "bad beep." Keep in mind that malfunctions generally result in multiple symptoms. To use this guide, which is written according to symptoms, you will have to match your system's indications to those in the diagnostic table. The key to your success in using this guide may lie in your ability to describe your system's malfunction in more than one way (e.g., is every other line "a solid band" or is it "inverse video"?).

Part III, which you'll find in next month's *A+*, will deal with malfunctions that allow the computer to produce a good beep, even though something is wrong.

Use the diagnostic table to cross-check your malfunction with the trouble-tree guide. If you cannot find your malfunction here, chances are that you have a bad memory chip. It is unlikely that your ROM chips (locations F3 to F11) are bad or that the CPU has gone bad.

A special note about Apple II RAM chips in the memory area on the motherboard: You can completely remove the second and third rows of RAM chips from the computer (locations D3 to D10 and E3 to E10) and the computer will still run fine. You will not be able to operate floppy-disk drives, use any graphics mode, or do extensive programming, but you will be able to execute short, simple programs, thereby

DOW, CLEMENT & SIMSON

verifying the system's basic health. If this guide does not list or solve your malfunction, you should remove the second and third rows of RAM chips, turn the computer on, and see if the computer works. A bad RAM chip in any row can cause any number of graphic, peripheral, or programming problems and is likely to lock the computer up. Try swapping the RAM chips in and out of row 1 in order to isolate the bad chip. Another good source of RAM chips and some rare motherboard chips is on your peripheral cards. The 16K Language Card has at least eight RAM chips and many of the rare chips for the motherboard that are otherwise unique to it.

▶ DIAGNOSTIC TROUBLE TREE, PART I

A. No beep, bad text, keyboard lockout

Chip	Location	Malfunction/Indication
555	A13	No beep; horizontal bars in text; video interspaced by horizontal color bands; will not accept keyboard inputs or reset.
74LS175	B1	No beep; no video at all; you are totally in the dark; keyboard and reset have no effect.
74LS86	B2	No beep; no video at all; you are totally in the dark; keyboard and reset have no effect.
74LS174	B5	No beep; no text; flooded screen with horizontal and vertical bands or small black squares; will not accept keyboard inputs; no GR; HGR may try to static very faintly.
74LS257	B6	No beep; array of flashing question marks with occasional random characters; will not accept keyboard inputs; rapid resets may cause horizontal bars with color bands in between. Revision 0/6: three sets of horizontal bands; KB/LO, reset will induce random color blocks. 1978 models will have every other line in inverse video with random characters.
74LS257	B7	No beep; no text; flooded with random blocks; will not accept keyboard inputs or reset. Revision 0/6: every other line has inverse video with random characters in all lines, some flashing.
74LS257	B7	Revision 0/6 only: no beep even with rapid resets (Revision 7 will screech or static, see section T). Every other line has inverse video with random characters in all lines, some flashing.
74LS08	B11	No beep; flooded video with three horizontal bars evenly spaced. Will not accept keyboard or reset.
74LS153	C1	No beep; black screen, no video; will not accept keyboard or reset.
74LS195	C2	No beep; no video, totally dead appearance; will not accept keyboard or reset inputs.
74LS04	C11	No beep; rolling array of question marks or color bands; will not accept keyboard or reset inputs. Revision 0/6: array of small dark blocks; some models will have every other line in inverse video with random characters in all lines, some flashing.
ROM-F8	F3	No beep; flashing array of question marks with stray characters; keyboard lockout.

A. (Continued)

Chip	Location	Malfunction/Indication
74LS138	F13	No beep; every other line has inverse video; random color blocks gradually fill in the screen, top to bottom, and then begin to scroll up the screen; keyboard and reset lockout; some models may have random characters, a few of them flashing.
8T97	H3 H4	No beep; horizontal solid bands with color bands in between; may get random color block; keyboard and reset lockout. Note: Do not swap with 8T97 at H4, since they cause the same malfunction.
8T97	H5	No beep; horizontal solid bands with color bands in between. May have random color blocks. Has no HGR but may flip into HGR mode with every other line in inverse video and flashing question marks in the text area; keyboard and reset lockout.
6502 (CPU)	H7	No beep; every other line has inverse video with random color bands in between; keyboard and reset lockout. Revision 0/6 has vertical columns of A and @. Reset may "pop" the speaker.
8T28	H10	No beep; flashing array of question marks and some stray characters; keyboard and reset lockout.
8T28	H11	No beep; every other line has inverse video with color bands in between; keyboard and reset lockout.
74LS138	H12	No beep, color blocks gradually fill in the screen with random characters and then begin to scroll vertically up the screen; keyboard and reset lockout. Revision 0/6: some models will show APPLE II at the top and have faint speaker static.
74LS00	A2	No beep; nothing; keyboard and reset lockout.
74LS32	C14	No beep; flooded video. On Revision 7 models, reset may cause very faint, short "pop" from the speaker. Because of flooding, you can't see if there is a keyboard response.

B. No beep, bad text, bad GR, bad HGR/2, keyboard will respond

Chip	Location	Malfunction/Indication
74LS257	B6	No beep; solid horizontal bands (inverse video) with color bands in between; rapid series of resets may occasionally

B. (Continued)

Chip	Location	Malfunction/Indication
		cause display to produce an array of flashing question marks with random characters; will not accept keyboard inputs. Some older models may have three sets of horizontal bands with random color bands in between.
74LS174	B8	No beep; text flooded with random stray blocks. Apparent keyboard and reset lockout; Revision 0/6 will "pop" when reset; display looks like vertical tire marks on some models and alternating rows of O's and question marks on newer models.
74LS32	C14	No beep; flooded video. On Revision 7 models, reset may cause faint, short "pop" from the speaker because of flooding. You can't see if there is a keyboard response.
74LS20	D2	No beep; full array of flashing question marks; may have stray characters; keyboard lockout, but rapid reset changes random characters.
74LS153	E11	No beep. Revision 0/6 has a nonflashing array of @ signs; Revision 7 has a full array of flashing question marks. Rapid resets produce random characters; keyboard lockout.
74LS153	E13	No beep; solid horizontal bands with color bands in between; reset causes flashing and random characters; keyboard lockout.
74LS139	F2	No beep; scrambled horizontal color bands; reset causes arrangements to change but no beep; occasionally the array will be scrambled characters, some flashing; keyboard lockout.
ROM-F8	F3	No beep; flashing array of question marks with stray characters; keyboard lockout.
74LS138	F12	No beep; solid horizontal bands with color band in between; may have random color blocks; reset inserts random color blocks; keyboard lockout. Revision 0/6: keyboard and reset lockout.
74LS257	J1	No beep; flooded video; keyboard lockout for commanding, but repeated attempts with any key or rapid resets may cause a GR/HGR display with row after row of small dark square blocks.

C. Bad beep, bad text, bad GR, good HGR, good keyboard
D. Bad beep, bad text, good GR, HGR
E. Bad beep, bad text, bad HGR, good GR
F. Bad beep, keyboard and reset lockout, good text, GR, HGR
G. Bad beep, bad GR, bad HGR, good text
H. Bad beep, bad GR, good text, HGR
I. Bad beep, good text, GR, HGR
J. Bad beep, bad HGR, good text, GR +

▶ DIAGNOSTIC TABLE

OBSERVABLE BAD SYMPTOMS	Branch to Probable Fix (Section)*																							
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X
Beep	●	●	●	●	●	●	●	●	●	●														
Text	●	●	●	●	●						●	●	●	●	●									
Keyboard Inputs**	●					●					●					●								
GR		●	●				●	●				●	●				●	●						
HGR/2		●			●		●			●		●		●			●		●					
Erratic Beep																				●				
Black or No Cursor																					●			
Scrolling Video																						●		
No Video																							●	
Bad Peripheral Control																								●

* *K through X will be discussed in Diagnostic Trouble Tree, Part II in the August issue of* A+.

***Keyboard Input includes all the keys and the Reset button. Any response, audio or visual constitutes a "Good Keyboard" for analysis.*

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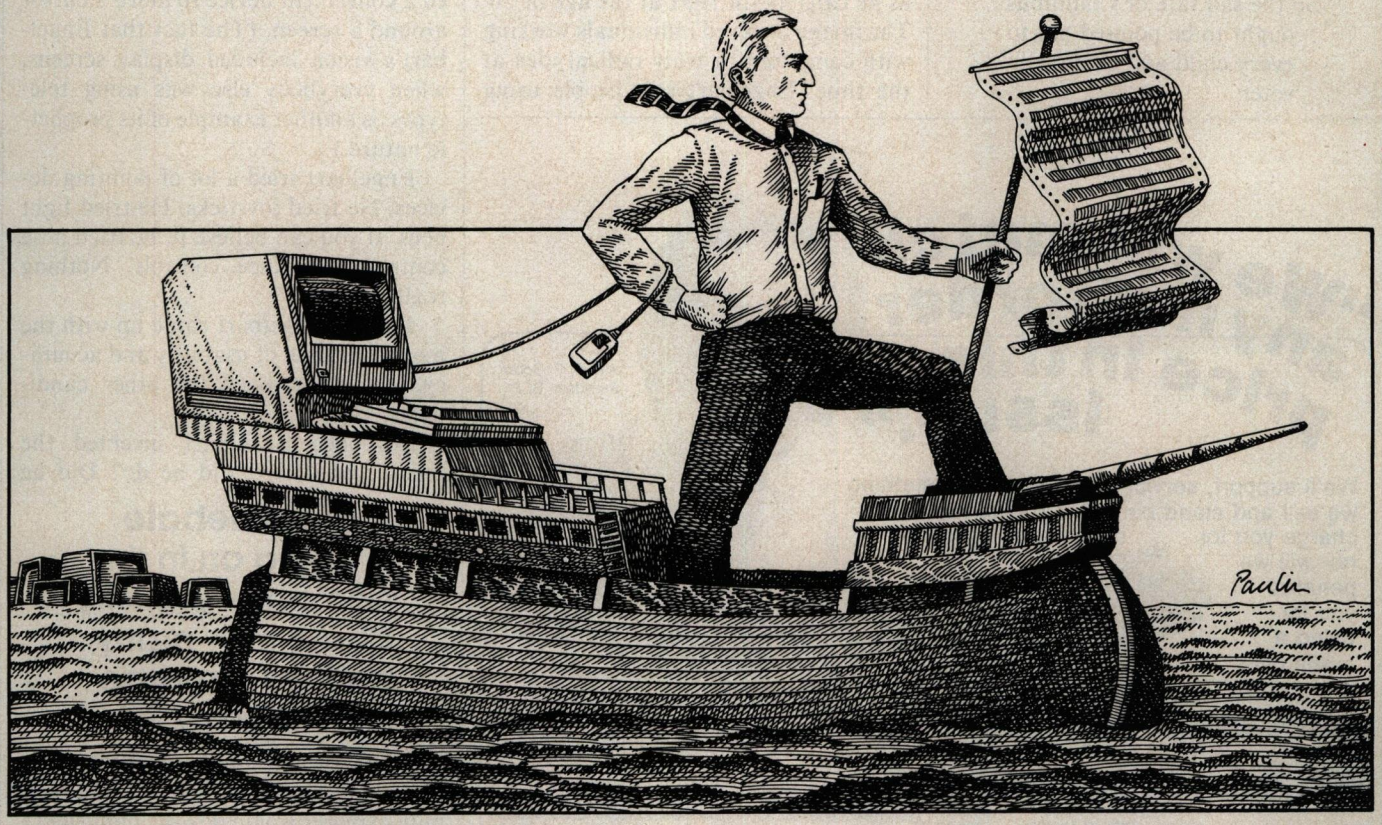
ELECTRONIC BRAINSTORMING
BY JOHN UNGER ZUSSMAN

Mamas, don't let your babies grow up to be inventors.



FATHER OF THE MOUSE

Before you read this column, take a quick survey of ten friends. (No, really, go ahead. I'll wait.) First ask:

1. What's the most distinctive feature of Apple's Macintosh?
(a) Its unique keyboard
(b) The box it comes in
(c) Its mouse
(d) All the hype

Everybody get (c)—the mouse? OK, now ask:

2. Who's responsible for the Macintosh mouse?
(a) Thomas Edison
(b) Steve Jobs
(c) Walt Disney
(d) Doug Engelbart

The obvious answer is (b). Jobs gets the credit. Betcha nobody answered (d)—Doug Engelbart.

Who?

You know, Doug Engelbart. The guy who had a vision of a truly personal computer system, back in 1951 when Steve Jobs wasn't born yet.

The guy who *invented* the mouse, back in 1964 when Steve Jobs was learning his multiplication tables.

The guy who might make a few bucks on his invention, though Steve Jobs will make millions.

Although Columbus was the better explorer, Vespucci was the better marketer.

Oh. *That* Doug Engelbart.

A Lament

You can read elsewhere in this issue all about how Doug Engelbart invented the mouse. This is a different story—a lament, really—about the spread of ideas and the distribution of rewards.

The closest historical parallel I can find is the case of Christopher Columbus and Amerigo Vespucci. According to my trusty *Britannica*, Vespucci's first authenticated trip to America was in 1499, when Columbus was already on his third voyage. Vespucci served as navigator, not as captain. But Vespucci was among the first to realize that he had arrived, not in Asia, but in a "New World." A scholar suggested that the lands be named after Vespucci, and the proposal caught on.

(Fortunately the scholar had the sense to use Vespucci's given name, Amerigo; otherwise Silicon Valley would be located on the continent of North Vespucci. Still, it's not called North Columbia.)

What's important is that although

DOUG PAULIN

Columbus was the better explorer, Vespucci was the better marketer. Columbus beat Vespucci to America, but he was more interested in exploring and colonizing further. He returned from his third voyage in chains, and, as Ogden Nash observed:

The fetters gave him welts,
And they named America after somebody else,
So the sad fate of Columbus ought to be pointed out to every child and every voter,
Because it has a very important moral, which is, Don't be a discoverer, be a promoter.

Prescient Image

Soft-spoken and distinguished, Doug Engelbart has always been more interested in discovering than in promoting. In fact, he has dedicated most of his adult life to exploring the implications of a vision he had—an "image," as he calls it—in 1951 at the age of 26. The image involved individuals working with computers, a truly radical idea at the time. Engelbart saw people using computers to cope with the increasing complexity and urgency of the world. He saw computers that would do more than crunch numbers, that would "augment human intelligence."

The mouse is only one component of the way Engelbart worked out his image. While developing his ideas at the Stanford Research Institute (now SRI International) in the mid-60s, he needed a convenient device to move a cursor around a screen. (The fact that Engelbart's vision included display screens, when everybody else was using teletypes, is another example of its prophetic nature.)

Engelbart tried a lot of pointing devices. He tried joysticks. He tried light pens. If you can believe it, he tried nose controls and knee controls. Nothing really worked.

Finally, Engelbart came up with the mouse. In tests of usability and accuracy, it far surpassed the other candidates.

So, once Engelbart invented the mouse, what next did he do? Did he form his own company to market the thing? Of course not. He did what any pure explorer would do—he published a paper on it in an engineering journal. Then he went on to other discoveries.

A great debate is going on in the computer industry about how many buttons a mouse should have.

Meanwhile, several members of his team at SRI ended up working at Xerox's Palo Alto Research Center (PARC). They took the mouse idea with them and eventually used it in the machine that became the Xerox Star. That's where Steve Jobs saw it; the rest is history.

Button Debate

In his office at Tymshare (he joined Tymshare when the company bought the rights to his system—now called Augment—from SRI in 1977), Engelbart showed me the original mouse. It's large and unwieldy by today's standards and made of hand-carved wood, not plastic. It rides on two perpendicular wheels—circular blades really—that protrude through the bottom.

A great debate is going on in the computer industry about how many buttons a mouse should have. The Lisa and the Macintosh mice have one button; the Star and Microsoft mice have

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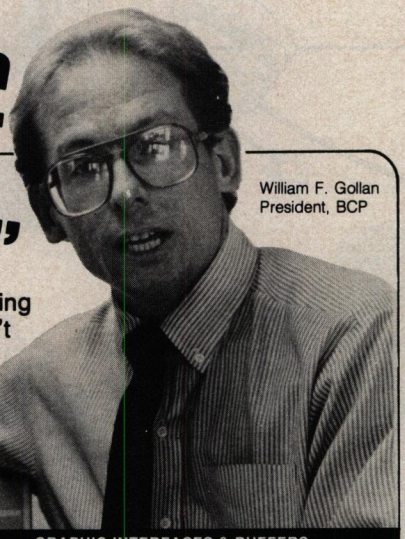

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Prometheus Pro 1200	389.95	Hayes Micro IIe ws	249.95
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Koala Graphic Pad	84.95	TG Paddles	29.95
Kraft Joysticks	45.95	Titan Technologies	
Hayes Mach III	**45.95**	Accellorator II/IIE	429.95
Microsoft		**64k Ram II+**	**259.95.**
Z80 CP/M Softcard	229.95	**128k Ram II+**	**319.95**
Premium Pack II+	459.95	Neptune 64k+80	199.95
Premium Pack IIe	**299.95**	Neptune 128k +80	299.95
Synetix		**Neptune 192k+80**	**339.95**
Flashcard 144 kb	309.95	Videx Videoterm w/ss	229.95
Flashcard 288 kb	449.95	Videx Ultraterm	279.95
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two; still others have three or even four. With apologies to Nash:

The one-button mouse
Is a simple reflex.
The two-button mouse
Is a bit more complex.
But I confess
I'm a bit confused
About how the three-button
Mouse is used.

Engelbart's views on this issue are purely pragmatic. His original mouse had a single small, red button because only one selection action was needed. As the functions of the device broadened, Engelbart's mouse grew two more buttons. He would have preferred more, but three switches were the most that would fit.

While demonstrating Augment, Engelbart had some trouble with his sleek new mouse. "I never had these problems with my old clunker," he explains ruefully. The man's got a new Ferrari, and he still has fond memories of his '57 Plymouth.

Retroactive Reward

SRI now has a royalty program that rewards employees who develop patentable inventions. Unfortunately, it had no such program when Engelbart worked there.

So, last December SRI threw a surprise luncheon for Engelbart and presented him with a "nice-size check" in recognition of his invention. Although the check was much smaller than a royalty percentage would have been, Engelbart was clearly moved. "SRI had no obligation at all," he says. "They voluntarily gave me a gift."

The check came in handy because

'My compulsion is to develop high-performance tools. I'm always at the leading edge, where there's no ready market.'

Engelbart has not been financially secure. His house burned down seven years ago. His life since then has been filled with financial, legal, and emotional disasters.

Engelbart is philosophical about other people making big bucks from his invention. "By the time you're an old grandfather, you realize what it takes in sweat and capital to bring products to market," he explains. "My compulsion is to develop high-performance tools. I'm always at the leading edge, where there's no ready market. I've tried to shake that compulsion, but I get more and more embedded in it."

If Engelbart bears no resentment toward those who profit from his ideas, he isn't pleased with the way those ideas are trickling out. "The mouse is just one little tiny corner of all the things we did," he says. "It doesn't make a whole lot of sense to take it out of context."

The context, as Engelbart has created it in Augment, includes a host of unusual components and features. The command language is open-ended. Files are arranged hierarchically, and every item can be individually addressed and shared with other users. You can open windows to view several files at once.

Engelbart's mouse sits to the right of his keyboard. To the left is another device that looks just as strange, like five white piano keys. Engelbart calls it a "chord keyset," and by pressing combinations of keys, he can type with it. He estimates that it can do about 30 words a minute on the highway. "But it's not meant to compete with the keyboard," he notes. "It's mostly for typing com-

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mands with your left hand while you're moving the mouse with your right." In fact, you need to keep one hand on the mouse while using the keyset because the mouse buttons determine whether the keyset produces uppercase characters, lowercase characters, symbols, or views.

When Engelbart is up to speed, the system resembles a calliope. His right hand jumps from keyboard to mouse and back, his left hand from keyboard to keyset. The cursor flies around the screen, windows appear and change size, text is transformed. I can't wait to see the foot pedals.

It's the removal of his inventions from their context that bothers Engelbart.

Out of Context

I asked Engelbart if he's surprised at the sudden recent success of the mouse. "Not at all," he replied. "In fact, I wonder why it took so long." Engelbart fully expects the world to discover the other aspects of his system in the same way.

It might happen. Multiple windows are already the rage; several recent "idea processing" programs reflect the hierarchical organization of data.

Still, widespread success seems unlikely for the chord keyset. Its keystrokes, which are coded in a simple, logical order, aren't perfected for typing common words or command combinations. Even at top speed it's much slower than a keyboard. Apparently, many Augment staff members, even those who are facile with a mouse, don't use the keyset. (Fifteen years ago, I probably would have laughed at the mouse, too.)

It's the removal of his inventions from their context that bothers Engelbart, much more than the scarcity of rewards. The whole system's meant to go together. It's like recognizing Columbus only for discovering Jamaica. Jamaica's nice, but there's so much more.

That's why critics such as Seymour Rubinstein—who quips that a mouse is a great pointing device, if you happen to have three arms—hardly faze Engelbart at all. "If you're wedded to a keyboard and have to go back and forth to the mouse, it *is* awkward," Engelbart explains. "But if you add the keyset, it's a lot better."

Engelbart, in turn, is critical of the way the mouse is used in systems such as the Lisa, the Macintosh, and the Star. Since he developed the mouse specifically for selecting text, Engelbart believes its purpose is corrupted when it's used to give commands as well, and it's cumbersome to have to keep moving the cursor up to the command line all the time. "You do too much work with one hand only, while the other is sitting there useless," he says. "The designers of these systems have not rationally examined the expectations of users." With the keyset, you can type a command with one hand and select its object with the other.

The use of the mouse is a good example of why Engelbart believes that "high-performance users" are being neglected by the computer industry. It's his primary argument with the way the world uses technology. "Most people enjoy getting more proficient," Engelbart observes. "You can see that simply by visiting a ski resort, or by watching a child learn to ride a bicycle. But everything today is designed for novices, and it keeps people at that level. All they get is bunny slopes. All the bikes have training wheels."

Engelbart says he wishes that significant efforts—even 5% of product-development resources—were being devoted to high-performance users. "Remember, the definition of *high performance* keeps changing," he warns. "Today's high-performance user will be the norm in five years."

'Everything today is designed for novices, and it keeps people at that level. All they get is bunny slopes.'

Dissatisfied Sage

Doug Engelbart has had numerous successes. He's seen many of his ideas recognized and put to use in marketed products. He's often interviewed and is recognized as a sort of sage of personal computing.

Still, Engelbart is dissatisfied. Tymshare markets his Augment system on mainframes and is currently developing it for minicomputers. It has no plans to offer it for personal computers, however, where it could reach the masses. Engelbart is resigned to seeing his dream realized gradually, in small pieces.

"The potential of this idea is huge, much larger than you ever see expressed," he says. "It's frustrating to

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wait for that to be recognized."

Engelbart isn't even satisfied with what he's already developed. He'd like to be back in the lab, exploring more new territory. For example, the system was designed to incorporate graphics, but funds for implementation are not yet available. "As far as I'm concerned," he says, "all this evolution was arrested ten years ago." Since Tymshare acquired his system, it has solidified into a marketable product, and

'Let's consciously pursue the kinds of changes we can make.'

some improvements have been made. But Engelbart misses the fast pace of development in his SRI lab.

Earlier this season, "Saturday Night Live" did a sketch about a talk-show guest who lived 30 seconds ahead of the present. He's say something such as, "Oh, as long as I can remember, ever since I was a kid." These statements caused great confusion until half a minute later, when the host asked, "How long have you been living ahead of everybody else?"

Doug Engelbart has the same problem. But his clock runs *15 years* early, not just 30 seconds.

"You use a word processor, don't you?" he asks. "What if you'd tried to tell somebody, 15 years ago, about the advantages of word processing? What's the chance that you could have convinced them to pay money for it? Until people have experience with these things, their perception of value is nonexistent or mostly negative. Well, I was promoting *all* these ideas then, and no one would listen.

"There's a big effort to make sure that people don't have to change to use these tools," Engelbart observes. "I think that's misguided. This new technology is a great opportunity to change, and we ought to make the best of it. Let's consciously pursue the kinds of changes we can make—in language, methodology, customs, organizations, and roles."

Doug Engelbart has the great privilege of being a man of vision, an inventor, explorer, discoverer of a new world. But with that privilege has come the great frustration of trying to communicate his vision to a world that's not ready for it.

When you live 15 years ahead of your time, you're sometimes lonely. ✚

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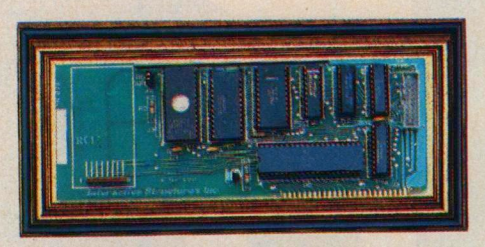

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CIRCLE 274 ON READER SERVICE CARD

A+ THAT'S ENTERTAINMENT

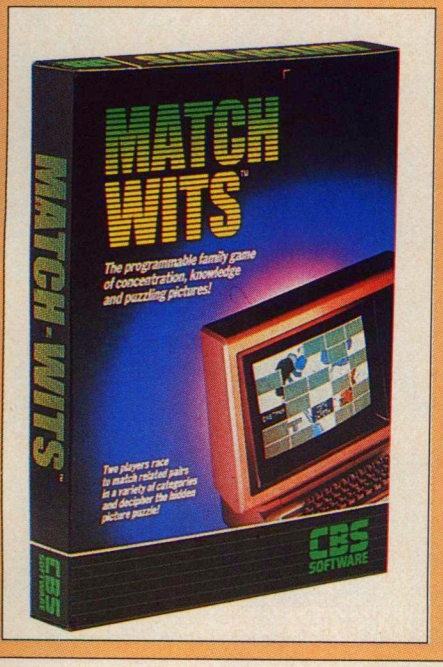
GAME REVIEWS

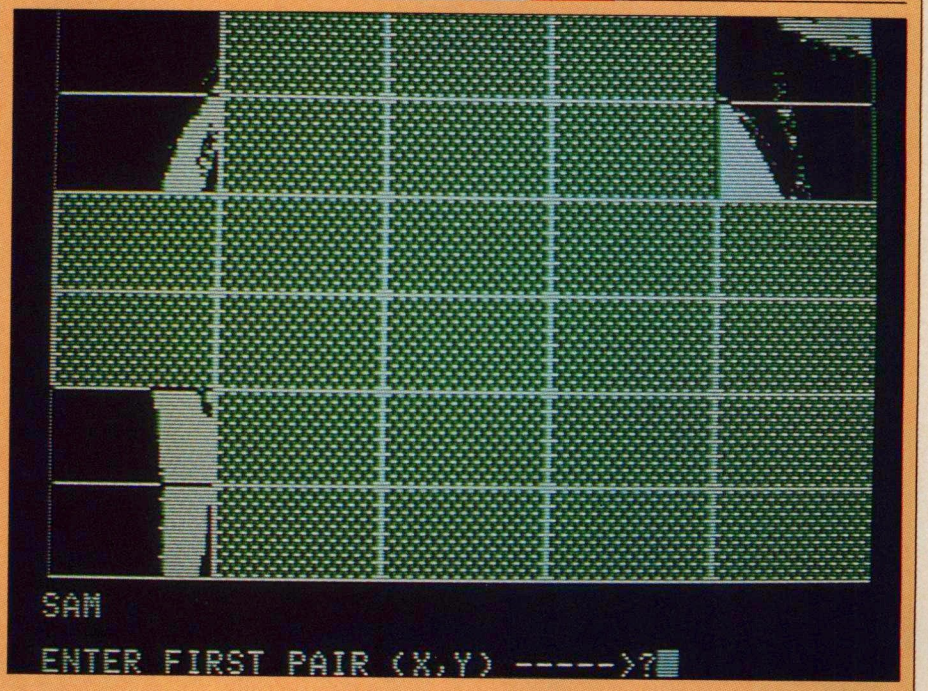
MATCH-WITS

CBS Software
One Fawcett Place
Greenwich, CT 06836
List Price: $29.95
Requirements: Apple II Plus or IIe, 48K RAM, one disk drive, DOS 3.3, black-and-white or color monitor

CIRCLE 750 ON READER SERVICE CARD

If you liked the classic TV game show *Concentration*, you will like Match-Wits, from CBS Software. In this entertaining and educational game, two players or two teams match pairs of words, numbers, or characters in order to solve a hi-resolution picture puzzle hidden behind the game board. As players correctly match the pairs, parts of the puzzle appear.





Players can add their own pairs or use the six categories on the program disk. Your ability to change the games but not the puzzles makes Match-Wits suitable for many subjects and a wide range of ages.

Concentration lovers will recognize the game board, which consists of 30 boxes on a five-by-six-box grid. No numbers identify the boxes, however. To select a box, you use an x, y coordinate system in which x represents the column number and y is the row number. For example, if you enter 3,4, you see what is inside the box that is three columns from the left and four rows from the bottom. If you don't put a comma between the two coordinates, the computer cannot execute your command. This program is particular about its inputs. The use of coordinates forces students to learn about a two-dimensional grid system.

When you select a box, the word, phrase, or number behind it appears. If you make a match (such as Pittsburgh and Steel City), you get points, and the two pieces of the puzzle behind the matching boxes appear. Each time you reveal two new puzzle parts, you have 20 seconds to type in the solution to the puzzle, which is a frustrating requirement for poor typists.

If your guess is incorrect, your opponent gets a chance to solve the puzzle. If the pair you select does not match, then the items are covered and your opponent selects a pair. Players must remember where the words are located, and they must know the relationship between the pairs. If you select a matching pair, you get another turn if you can't solve the puzzle.

The object of the game is to score points by making matches and to solve the puzzle as you reveal the pictures

underneath the matching locations. A complete Match-Wits game consists of three rounds of single games. After three rounds, the player or team with the highest number of points wins. You win 150 points by correctly matching two locations, and you win 1000 points by solving the puzzle.

Winners of a complete game of three rounds can play the same opponent,

The object of the game is to score points by making matches and to solve the puzzle as you reveal the pictures underneath the matching locations.

take on a new challenger, or quit. Puzzles accept three variations of the solution as well as minor typing errors. For example, THATS and THAT'S are considered equivalent.

You choose from 18 hi-res picture puzzles; unfortunately, you cannot create new ones. Each time you begin a single game, the computer randomly chooses one of the 18 pictures. Although you do not need a color monitor, if you do have one, the pictures are colorful and attractive.

From a series of categories, players select the subject matter for each game. Each category contains three titles or sets. Categories usually have sets of similar subjects, and they may become increasingly difficult. Teachers can devise games in which each set in a category becomes more challenging; students must play an entire set in order to win a complete game. Recreational players do not have to follow such rules.

Match-Wits comes with a preprogrammed Game menu that lists six game categories: sports, words, cities, famous people, multiplication, and animals. All categories contain three sets of 15–30 matching pairs. Famous people, for example, consists of three sets: authors, actors, and inventors.

With the Match-Wits Secretary, you create new game files, update old ones, or delete files. A print option lets you print out the lists of pairs in a file. Each entry can contain from 1 to 24 characters.

A set can have as few as 10 pairs, and the computer will automatically add free pairs of keyboard characers such as $, #, %, or &. Unlike the original *Concentration* game, however, Match-Wits has no wild cards that are automatic matches when you select them. Therefore, no extra pairs that cannot be matched are left at game's end.

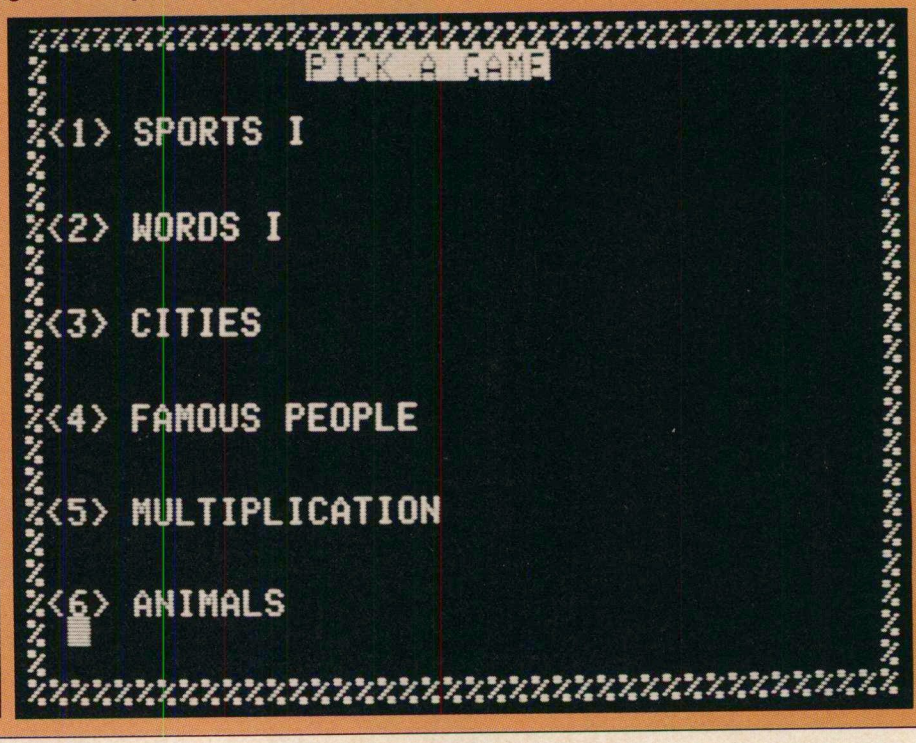
Although the games on this disk contain related pairs, you can enter identical items as matches, as players did in the original game.

Writing and editing new games is easy with the Secretary. Each pair that you type in is displayed in a box; you see how it will look on the screen. If an item is misspelled or not centered properly, you can edit it immediately. The program disk holds 16 game files, and you can store additional games on initialized DOS 3.3 diskettes.

Editing the Game menu can cause some confusion. The Match-Wits games all operate from a main Game menu. You edit the Game menu within the Secretary by choosing the game files that you want to include. The Game menu must contain at least two files or categories but can hold as many as eight. You cannot use files if they are not on the Game menu, even if they are stored on the program disk.

To use files, you must physically save them on the program disk. Although files can be stored on separate disks, they cannot be used unless you move them back onto the game disk with the FID program on your System Master diskette. This requirement is not mentioned in the instruction manual. Unfortunately, you cannot access a storage disk from the Match-Wits program.

Although Match-Wits is a sophisticated product, it contains one glaring error. It appears as you try to exit from the Secretary to go back to the Match-Wits game. The program tries to load in the game, but FILE NOT FOUND BREAK IN 7010 appears on the screen. You are left in the disk-operating system, which the author has modified so that the CATALOG command returns the message SYNTAX ERROR. You have to reboot or return to the Match-Wits game.



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The new ALPHABITS™ serial interface will soon establish a new standard for serial interfaces with bundled software. This new plug-in product for the Apple® II series, which was introduced at the "Apple II Forever Expo," emulates the new Apple IIc serial ports. Now Apple II series users can run software and peripherals designed for the IIc.

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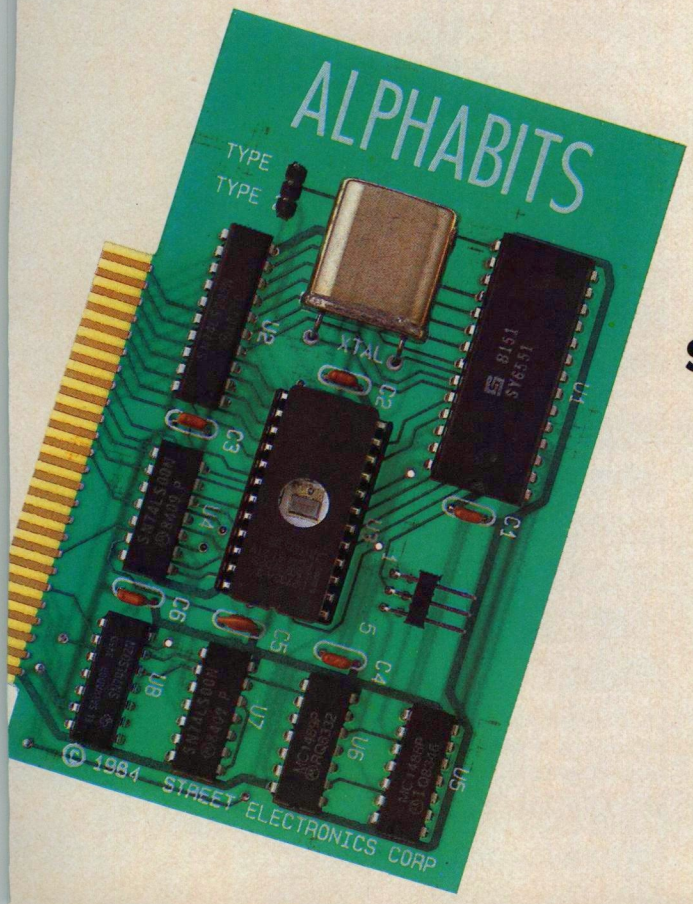

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212A Modem Comparison Chart*

STANDARD FEATURES	PRO	HAYES STACK	NOVATION SMARTCAT	ANCHOR 1200	US ROBOTICS PASSWORD
300/1200 Baud (212A)	✓	✓	✓	✓	✓
Intelligent Microprocessor	✓	✓	✓	✓	✓
Tone and Pulse Dialing	✓	✓	✓	✓	✓
Hayes Command Compatible (Works with Smartcom™)	✓	✓		✓	✓
Additional telephone jack with exclusion switching	✓			✓	
Analog loop back self test	✓	✓	✓		
Self Test at Power Up	✓				
Call Progress Detection (Busy, Dial Tones, Trunk Busy, etc.)	✓				
Speaker and External Volume Control	✓	✓	✓		
Full Complement of Status Lights	✓	✓			
8 Switch Selectable power-up defaults	✓	✓			
Adaptive Dialing	✓				
Auto Redial on Busy	✓				
Ergonomically designed easy to read front display panel	✓				
Internal Stand-Alone Power Supply	✓				
Built in Real Time Clock/Calendar	✓				
Help Command	✓				
300 baud connect while maintaining 1200 baud RS-232 link	✓				

EXPANDABLE OPTIONS	
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Automatic Transmit Buffer	✓
On-board Personal/Business Directory	✓
Buffer, Expandable to 64K	✓
Auto Logon Macros	✓
Auto message transmission to groups of numbers	✓
Records call duration	✓
12-character Alphanumeric Display	✓

*Comparison made by Prometheus on the basis of the best information available to Prometheus at time of printing.

CIRCLE 122 ON READER SERVICE CARD

Match-Wits is easy to play once you get the knack of the coordinate system. With the few exceptions mentioned, the Secretary is also easy to use, especially when you create pairs. Complete instructions are available on the screen.

In addition, a seven-page manual contains instructions similar to the ones on the screen. It also includes information about setting up your computer, playing Match-Wits, using the Secretary, and categories for new games. In general, the manual is concise and clear, but page numbers and a table of contents would help.

Match-Wits users need little if any support. This is good, because CBS Software apparently does not offer customer support. This conclusion is based on the fact that no phone number is listed on the software, even for sales information. You could write to CBS or ask your computer dealer for assistance.

CBS products come with a 90-day limited warranty. The package contains no backups. Defective disks are replaced free of charge within the 90-day period if you include proof of purchase and a description of the defect. After 90 days, you are charged for replacement diskettes.

Doug and Denise Green

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Requires: Apple II Plus, IIe, or III (Millionaire); Apple II Plus or IIe (Tycoon); 48K RAM.

CIRCLE 751 ON READER SERVICE CARD

Imagine trading soybeans, wheat, orange juice, and other commodities on your Apple. You can make or lose a million as a volatile commodities market bulls its way to a new high or bears down on a new low. Commodities trading is a high-pressure, high-risk undertaking, demanding nerves of steel and a bit of intuition. A game on commodities trading has to be as fast-paced as the market itself, just as a game that lets you play Wall Street roulette on your Apple could turn out to be as speculative and unpredictable as the stock market itself.

Two games from Blue Chip Software live up to these descriptions. Millionaire, The Stock Market Simulation, and Tycoon, The Commodity Market Simulation, combine the fun of a game with the fascination of educational software. You play the market or enter the world of commodity trading without risking a penny and learn the fundamentals of investment finance or commodity trading.

Millionaire creates a stock-market environment containing 15 stocks divided into five industrial groups. Designer Jim Zuber picked the stocks of prominent companies, including Exxon, General Motors, IBM, United States Steel, and Sears, for the five groups—oil and gas, automotive, computer, heavy industry, and retail.

Tycoon involves 15 common commodities, including prominent agricultural, precious metal, and financial commodities—soybeans, pork bellies, silver, gold, Treasury bills, and Japanese yen.

Appropriately, the object of Millionaire and Tycoon is to make $1 million by buying and selling stocks or commodities. Reaching that plateau in the game, like striking it rich in the stock market or the commodities market, takes skill and luck.

Each Millionaire game lasts 91 turns, with each turn representing one week of trading and stock-market fluctuations. Each of Tycoon's 52 turns represents a week of trading and price fluctuations. Only one person can play at a time, but the game will save the name and status of up to 14 investors or traders.

New players start with a "novice" status level and $10,000 in cash. In Millionaire, although the game lasts until the 91st week, you actually start in week 14, leaving 77 weeks for wheeling and dealing. The first 13 weeks provide a historical perspective on the market. In the case of Tycoon, the game lasts until the 52nd week, and you start in week 2, giving you 51 weeks to work with.

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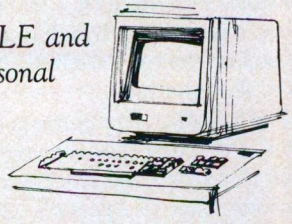

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CIRCLE 352 ON READER SERVICE CARD

Each week, stock or commodity prices change according to a variety of simulated market forces. Both games keep track of the fluctuations on several graphs. Millionaire plots an overall stock-market graph, which is the sum of the prices of all 15 stocks; a graph for each industry group, which is the sum of the prices of the three stocks in the group; and a graph for each stock.

As commodity prices change each week, Tycoon plots a commodity-index graph, which shows how the overall market is doing, and five graphs for each commodity—historical-price bar graph, scatter plot of weekly price changes, three-week moving price average, oscillator graph of net price change per contract, and point-and-figure graph for significant price changes.

At the beginning of each week, Millionaire displays the overall stock-market graph, followed by one of the five industry-group graphs. Tycoon gives you the commodity-market index and scatter plots for each commodity you hold. After the graphs or plots, both games display news items from *The Financial Journal*.

According to the manuals, these news items are the most significant clues to price fluctuations. Both games boast that the news items are based on actual events. When *The Financial Journal* prints out such gems as "K-Mart announced 250 stores will be opened this year," "Tandy announced dividends would be decreased by 18%," and "auto industry analysts predict relaxed safety rules will help profits," you expect soaring and plummeting stock prices. Similarly in Tycoon, "Pork demand called possible sign of eating habits change," "Retail price of orange juice could ease as supply grows," and "Soybean price watchers are mostly bearish," may signal that prices are going to start moving. Much like the real market, however, sometimes the news affects prices, and sometimes it doesn't.

After reading the *Journal's* headlines, you view a table of the weekly stock- or commodity-price changes. Much like the composite New York Stock Exchange section or the daily commodity listings in the financial pages of a newspaper, the table lists all 15 stocks or commodities price changes, high and low prices since the start of the game, and closing or current prices. In Millionaire, underneath the table, an analysis of the week's activity posts the number of winners and losers, how much the market as a whole gained or lost, and how much the average share increased or decreased. Tycoon posts the number of commodities that increased and decreased in price.

You are a high roller looking for a quick profit, not a staid investor searching for long-term dividends.

After discovering how the market fared during the week, you enter the Command mode, which offers a menu of options. You can redisplay any of the graphs, reread *The Financial Journal*, look over your portfolio, view prices, and conduct trading.

In Millionaire, trading means ruthless speculation. You are a high roller looking for a quick profit, not a staid investor searching for long-term dividends. In fact, if you buy a stock and hold on to it for an entire quarter, you will not receive one red cent in dividends.

The game offers a full range of trading techniques, including buying on margin, put and call options, and obtaining loans. However, before you can use some of these risky techniques, you must increase your status level.

In Tycoon, you have to consider that speculators divide into two camps in regard to predicting price changes. The technical approach relies on analysis of price trends to predict future changes and uses the five graphs for an individual commodity. The fundamental approach relies on the dynamics of supply and demand to predict prices and uses the news reports.

No matter which approach you use, the game basically lets you buy long (buy a contract, hoping the price rises) or sell short ("buy" a contract, hoping the price falls). When you start out as a novice, you are only allowed to buy long, and only with certain commodities—soybeans, wheat, cattle, and pork bellies. Your margin, or deposit, is 10%. To be able to trade other commodities, sell short, and decrease your margin requirements, you must increase your status level.

In Millionaire, your status level is determined by your net worth, which is the sum of your assets—cash, stocks, and options—minus liabilities—loans, taxes, and commissions. You start as a novice and must pay for stocks in full in cold cash. Boosting your net worth to $12,000 changes your status to "investor" and lets you buy stocks on margin; that is, you make a down payment of at least 50% of the value of the stock and get a credit from your broker for the balance.

Buying on margin is more expensive and riskier than straight cash purchases. Your broker, which is B.C. Software, charges 18% annual interest on margin credit. Furthermore, if the stock price drops significantly, your once friendly broker turns nasty and calls in the margin. This means you either cough up the cash to pay off the credit, or B.C. Software starts selling off your stock to recover loans. Of course, the obvious advantage is that you can buy twice as much stock in the hope of making twice the profit.

Your broker, which is B.C. Software, charges 18% annual interest on margin credit. Furthermore, if the stock price drops significantly, your once friendly broker turns nasty.

CIRCLE 135 ON READER SERVICE CARD

If you increase your net worth to $18,000, you become a "speculator" and can buy call options, which are the rights to buy stock at a specific price before an expiration date. Boost your net worth to $40,000 and you achieve the level of "professional" and can buy put options, which are the rights to sell stock at a specific price before an expiration date. You buy call options when you think the stock price will rise, and put options when you think the price will fall.

If you gain a net worth of $100,000, you become a "broker" and can borrow up to 80% of your net worth, to a maximum of $500,000. Buying stocks with an 80% loan and 50% margin gives you tremendous leverage, essential when climbing to the foremost status level—"millionaire." On the other hand, this combination of techniques also carries huge risks.

Once you gain a status level, you cannot lose it even if your net worth drops below the required amount. If your net worth falls below zero, though, you are declared bankrupt, your status reverts

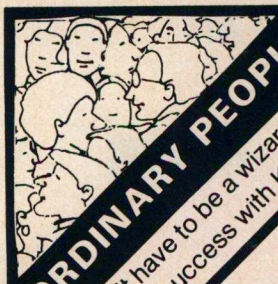
You can end up at the foremost status level, 'tycoon,' or you can end up bankrupt.

to novice, and you start over with only $7500 in cash. If you become a millionaire, you start with $50,000 and try to earn another million.

Tycoon has a similar hierarchy. Your net worth, which is the sum of your assets—cash and margin deposits—minus liabilities—taxes and commissions—determines your status. You start as a novice with a net worth of $10,000. Boosting your net worth to $15,000 changes your status to "investor," and lets you trade four additional commodities, and decreases your margin requirements for the four new commodities to 8%.

If you increase your net worth to $30,000, you become a "speculator" and can sell short. If you boost your net worth to $90,000, you earn the level of "professional," you can trade four additional commodities, and your margin requirements for those four new commodities drops to 6%. Increasing your net worth to $250,000 makes you a "broker," lets you trade three additional commodities, and lowers the margin on those three new commodities to 4%.

A lower margin requirement, while providing tremendous leverage, works both ways. Your net worth can increase and decrease dramatically. You can end



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There are many word processors available for the Apple Computer, each having different features and functions, and each claiming, in some way, superiority to the others. Trying to pick "the best one" to meet your requirements can seem like an impossible task. Softglow, from Softinson Data Corporation, may be the answer. Its features are listed below in some detail, and its price is inexpensive enough to justify its purchase even if you already own a word processor.

Some Facts—Softglow:

- is a true full screen editor for the Apple II, Apple II+, and Apple IIe—at all times, "what you see is what you get."
- is written completely in assembler language—system response time is very fast—screen update is instantaneous.
- uses standard DOS text files—so it's compatible with many other word processors.
- has fast loading of text files—up to 5 times normal speed.
- has standard word processing features—such as word wrap around, alpha lock, tab, and global search and replace; and some nonstandard ones such as soft hyphens and non-break spaces.
- supports lower case, the shift-key modification, and enhancer (under the keyboard) boards.
- utilizes the full capabilities of the Apple IIe.
- has fully buffered input—characters cannot be lost no matter how fast they are entered.
- software is unprotected—so making backup copies is no problem.

And Some Figures—Softglow Has:

- 12 Cursor Control Commands—including move cursor by word, page, and paragraph.
- 5 Modes of Updating Text—insert, delete left, delete right, replace, and case change.
- 9 DOS File Commands—uses standard DOS files—commands are: load, save, delete, catalog, lock, unlock, rename, verify, and initialize.
- 9 Block Commands—including delete, move, and copy a marked block; save and append a mark block to a file; and load a file at the current cursor position.
- 11 Find and Replace Options—including forward and backward search, wild card, whole word search, ignore upper and lower case, and replace all.
- 16K RAM Card—used, if available, for added text space.
- 25 Printer Format Commands—including left, full, center, and right justify; multiple headers and footers; draft copy; file insert and file chaining; the printing of text to any slot, or to a file for later printing or sending; and hyphen help.
- 20 Configuration Parameters—so the system can be customized to individual applications.
- 2K Macro Area—any characters typed at the keyboard can be entered as a macro, to be invoked by a one or two character sequence. Form letters are easily produced using this feature.
- 3 User Defined Files—configuration parameters, macro definitions, and tab stop positions can be loaded automatically at power-up, or loaded anytime while running the editor.
- 32 User Defined Tab Positions.

And The Best Figure Of All:

- $49.95—check or money order.

Sound complicated? It really isn't. Softglow is extremely easy to learn, and yet, unlike so many others, advanced enough to meet your future word processing needs. It's just possible that, for you, Softglow is the BEST WORD PROCESSOR IN THE WORLD!

To use the Softglow Word Processing System, you will need:

- An Apple II, Apple II+, or Apple IIe, with a minimum of 48K of memory.
- One or more 16-sector disk drives (DOS 3.3).
- A TV set or video monitor.
- A printer with interface card to print out documents.

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up at the foremost status level, "tycoon," or you can end up bankrupt.

Once you've gained a status level, you can lose only if your net worth falls below zero, at which point you are declared bankrupt, your status reverts to novice, and you start over with only $5000 in cash. If, or when, you become a tycoon, you start with $50,000 and try to find out how quickly you can earn another $1 million.

Nothing escapes the clutches of the IRS, and that includes your profits. When you sell stocks, options or commodities, the profits are taxed at 30%. If you sell for a loss, you receive a 30% tax credit.

In Millionaire, your broker takes a 1.5% commission of the total trading value—in Tycoon, it's 0.5%.

The Millionaire manual claims you can play a 77-week session in about two hours. Actually, Millionaire takes considerably longer, especially if you stop to contemplate the various graphs. If you take just three minutes a turn, the game runs three to four hours.

With Tycoon, you're supposed to be able to get in a 51-week session in about two hours. If you use the fundamental approach and only look at the news items, you can play a game in a little over an hour. If you use the technical approach and stop to contemplate the various graphs, though, the game can take much longer. Tycoon takes approximately eight minutes to load a new game, and two minutes to load a saved game.

With both games, you can save one game, with market conditions intact, on the disk.

Millionaire and Tycoon omit some options normally available to investors and speculators. Obviously, the real stock and commodity markets contain more than 15 stocks, so the game does not provide the variety of real life. Also, in Millionaire, dividends are never paid, no matter how long you own the stock.

As the market turns bullish or bearish, you are supposed to take advantage of the shifts to make your fortune. However, when you start out, you can only make money on a bull market because your status level is not high enough to permit you to buy put options in Millionaire or to sell short in Tycoon.

In Millionaire, if you pull out of a down market, you cannot make any money. If you stay in, chances are you will lose money.

I rode Exxon and Dow Chemical to stock-price highs, boosting my net worth from $10,000 to $15,000 as the overall market zoomed upward. I knew the market was due for a sharp drop, yet I was far short of the professional status that would permit me to buy put options, and my uninvested cash remained unproductive. I looked for stocks in more stable groups such as retail and computers.

The market fell for three straight months, and I rode Sears and Control Data to stock-price lows. My net worth dropped to $10,000. Unfortunately,

Millionaire does not let you bank your free cash and earn some of the interest you must pay when buying on margin credit.

In Tycoon, you also have to deal with fluctuations in the market. Real speculators can use an investment device called a spread. Spreading is the simultaneous purchase and sale of contracts in different months, or in different markets, with the expectation that a change in the price differential between the two will result. Tycoon's manual notes, "Spreads are not an appropriate strategy."

The manual suggests keeping a 30% cash reserve to cover losses. Unfortunately, that cash remains idle. Tycoon does not let you open a bank account and earn some interest.

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Tycoon contains several thoughtful touches to help you get involved in the game. When you first start, you can view a demonstration game, which takes you for a ten-minute tour covering all aspects of Tycoon. If you want to jump right in and play but don't want to start from scratch Tycoon already has a saved game on disk. A broker named Cheat graciously left $250,000 in cash for you to play with.

Tycoon also contains some rudimentary artificial intelligence designed to simulate investor behavior. Commodity exchanges limit the price movement that can occur during a single session. Sometimes, when your commodity's price approaches either the upper or lower limit, you will not be able to sell, or offset, that commodity until the next week.

I bought an orange-juice contract and held it while it posted a modest price increase over several weeks. Suddenly, the *Financial Journal* reported that the supply of orange juice was increasing, and the price dropped the maximum limit. I tried to sell, only to see the message, "Sorry, I cannot offset your position." Gray hairs started sprouting as I visualized further decreases that would wipe me out.

Then, luck struck. The *Financial Journal* reported the very next week that a killer frost had swept through the orchards. You can bet that news had me cheering. The price shot back up, and I sold the contract in a couple of weeks for a spectacular gain.

The *Financial Journal* reported the very next week that a killer frost had swept through the orchards. You can bet that news had me cheering. The price shot back up.

Tycoon also places an asterisk next to a commodity in your portfolio to signal when a contract is about to expire. If you manage to forget to offset your position when your contract comes due, the game automatically sells your commodity for $0.90 on the dollar.

Millionaire and Tycoon are not arcade games, so their graphics are meant to be legible, not awe-inspiring. The graphs and text are easy to decipher and read. The games do not contain any color.

If you manage to forget to offset your position when your contract comes due, the game automatically sells your commodity for $0.90 on the dollar.

Millionaire is void of any sound effects except for emitting a beep whenever you enter a wrong number or letter. Tycoon beeps whenever you're supposed to enter something.

The packaging is impressive. The black vinyl folders have a leather-like texture and the name "Millionaire" emblazoned in gold or silver across the front. Inside, Millionaire's 24-page rule booklet or Tycoon's 36-page manual, sporting a shiny silver or gold cover, and the disk fit snugly in clear plastic pockets. The Millionaire booklet contains numerous examples of play and an introductory tutorial on how the stock market works. Tycoon's has a tutorial on how commodities trading works, a glossary of terms, and a short description of each commodity. The games also contain quick-reference cards so you need not refer constantly to the booklet.

Both games are generally neutral in barraging you with good and bad news. In essence, they do a good job of working like the actual markets.

Russ Lockwood

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GAME FEATURE

ONE-ON-ONE

Basketball's best on your Apple

"I've seen a lot of sports video games, but never one as realistic as this . . . Dr. J and the Bird play exactly the way I picture them in real games. The animation is fantastic . . . it's a great fantasy." This description by Los Angeles Lakers basketball star Michael Cooper pretty much sums up one pro's reaction to one of the hottest entries into the volatile Apple game market.

Dr. J and Larry Bird Go One-on-One, from Electronic Arts, was a collaborative effort between chief programmer Eric Hammond and perhaps the two best forwards the game of basketball has ever seen, Julius (Dr. J) Erving and Larry Bird, whose stars shine for the home fans in Philadelphia and Boston, respectively.

For a lifelong fan such as Hammond, meeting and questioning his idols fulfilled his wildest fantasies. Hammond's interview with Dr. J yielded some 30 pages of detailed commentary, much of which appears in the booklet that accompanies the game, correlated with similarly trenchant remarks from Larry Bird.

These players are giants in their field, and One-on-One succeeds in capturing some of the playing style, personality, and presence of both players. The actual programming draws extensively on hours of film of the Bird and the Doctor playing against each other. Hammond studied the film in order to capture the full range of the players' styles, as well as their individual idiosyncrasies.

The game's intent is to capture the feeling of the real game of basketball as played by two specific players, and One-on-One is one of the best-executed games in the sports-simulation genre.

From the flashy slam-dunks and flying shots of the Doctor to the fakes and deadly outside shots of the Bird, this simulation is full of features that replicate key strategic basketball elements.

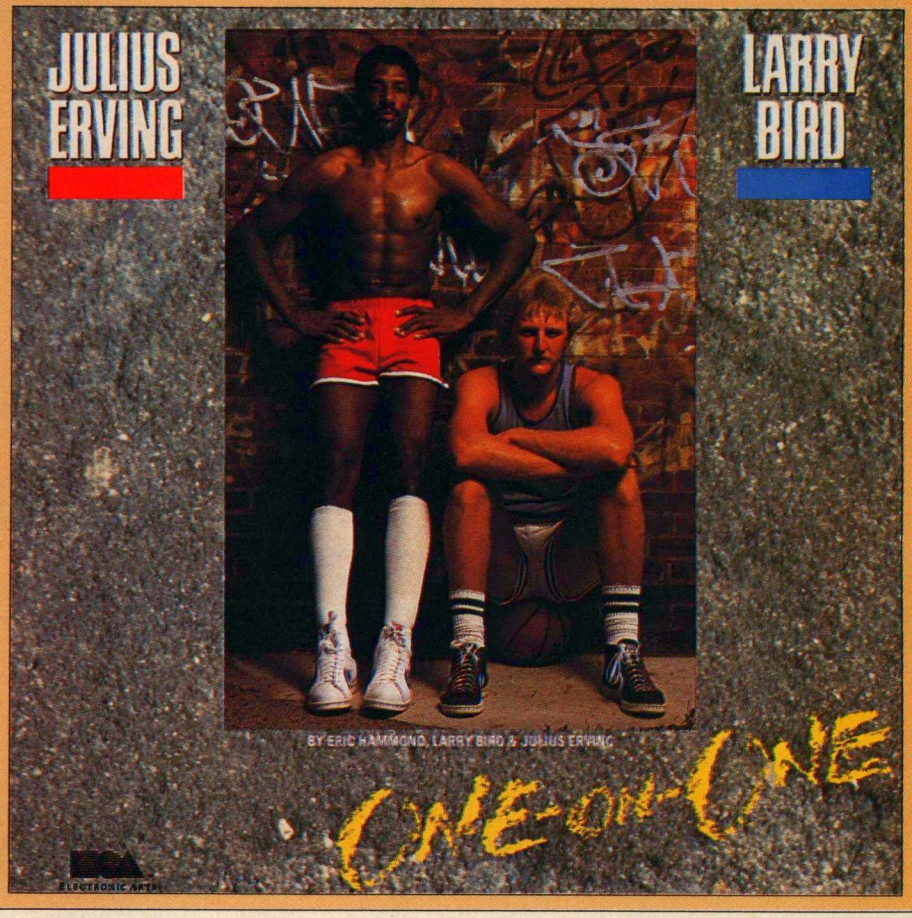
One-on-One is not merely an exercise in alien pixel blasting, but rather a chance to see opposing forms battling to put a ball through a hoop with the grace and style of the game's multimillion-dollar models.

The Playing Field

A single player has the option of being either Dr. J or the Bird, with the computer controlling the other player. You use the joystick to control player movement—the push button control causes different actions, depending on the situation. On offense, pushing the button starts a jump shot. The ball launches toward the basket when you release the button. Landing without releasing the button, i.e., not shooting the ball, results in a traveling violation and a turnover of possession. A quick push and release of the button causes the offensive player to spin 180°, either in place or while driving with the ball.

Defensive Play

The same button has different effects when you're on defense. Depending on the situation, pressing the button on defense will cause the defensive



player to go for the steal if the offensive player is dribbling, go for the block if the offensive player is shooting, or go for the rebound if the shot is already in the air.

With the proper finesse you can make your player drive, spin, jump, shoot, or dunk with the patented moves of Erving and Bird.

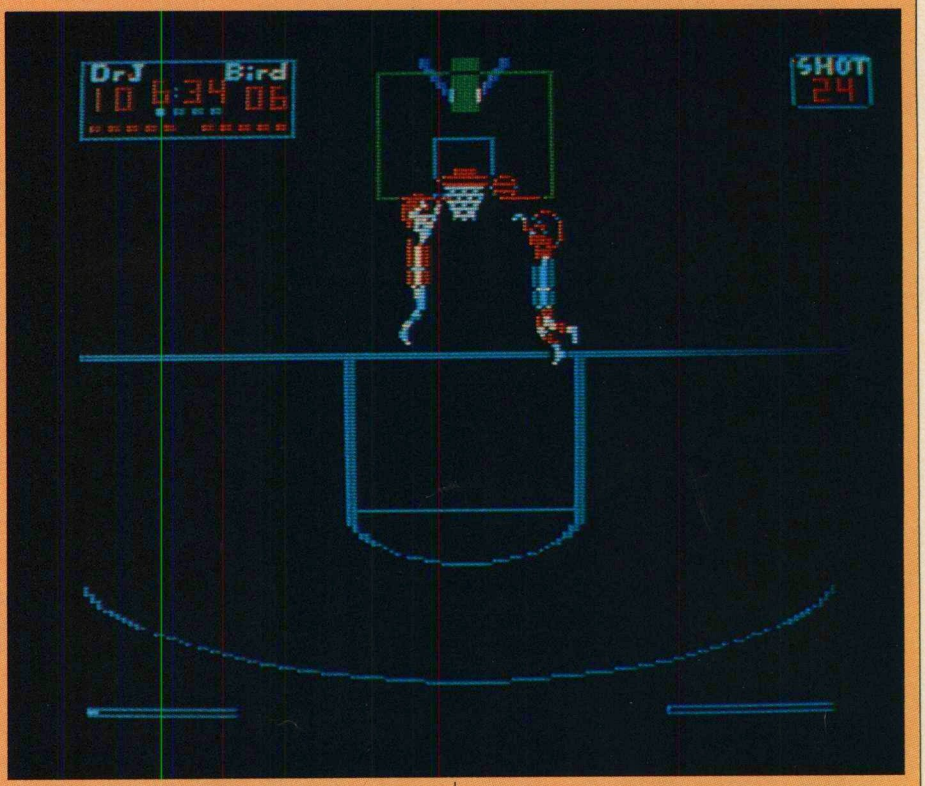
The main design objective for One-on-One was to create a game that would allow players to experience the most realistic simulation possible. Dribbling is automatic for the player in control of the ball, with its rate directly proportional to the ball handler's rate of travel, just as in the real world. To steal the ball, the defensive player must press the push button while he's in a position where he can intersect the path of the bouncing ball with his moving arms. After a successful steal, the new offensive player must clear the ball out past the free-throw line before attempting to score a basket.

The Two-Player Game

As enjoyable as the game is to play against the computer, it has a further dimension as a two-player game. This mode offers use of only one joystick—a tiresome and tedious prospect involving exchanging the joystick and keyboard between players. The player on offense

As enjoyable as the game is to play against the computer, it has a further dimension as a two-player game.

uses the joystick at all times; play freezes whenever ball possession changes hands, allowing the players to switch control devices and resume play after any keystroke. The keyboard just isn't adequate to the task of defending against an offensive player who's using a joystick. Playing defense from the keyboard is nearly impossible, as diagonal movement is not possible with the four direction keys and one action key.



Fortunately, the game I/O port of any Apple II can be adapted to accept two joystick controllers, and in this mode of play, the program excels.

Using Two Joysticks

It is possible, however, to allow both players to use joysticks and thus enjoy uninterrupted play while avoiding the inconvenient sharing of the single joystick. To achieve this goal, add an adapter that lets you connect two joysticks at the same time. See Product Information for a list of several acceptable adapters.

Three Ways to Adapt from SCRG

The available adapters are all pretty much the same. They all provide ports for two joysticks, and they all plug into the Apple's 16-pin game I/O socket. The main difference in these devices is the type of termination plug on the joysticks. The Apple II and II Plus both use 16-pin DIP sockets, and the Apple IIe has an external DB9 (or Atari-type) connector as well.

Since joysticks can get quite expensive, you might want to get an adapter that will let you use any joysticks you have access to or already own. The Paddle-Adapple from Southern California Research Group comes in three different versions to accommodate whatever is in your joystick arsenal: two 16-pin DIP plugs, two DB9 plugs, or one 16-pin DIP and one DB9 plug. This series of products has the added advantage of working with a second joystick on a IIe with the first joystick plugged into the DB9 connector in its back.

Two other adapters, not quite as flexible for this application, are the Wico Adapter, which accommodates two joysticks with DB9 plugs, and the Select-A-Port from TG Products, which must have two joysticks with 16-pin plugs in two of its five available sockets.

Whichever adapter you buy, make sure that it works with the joysticks you plan to use. Unfortunately, I know of no adapter that lets you mix all types of joysticks on Apple IIe's as well as on the older II and II Plus computers.

Another option is to build a simple adapter that allows simultaneous use of two joysticks. Anyone with basic wire-wrapping or soldering skills can build an adapter that will cost only a little time and a few dollars in parts. All you

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need are three 16-pin DIP sockets with solder-tail or wire-wrap pins, depending on the technique you use for connections; a 2 × 6-inch piece of standard perforated circuit board; any necessary wire and solder; and a dual 16-pin jumper for connection to the computer's game I/O port.

Alan Roszkiewicz

PRODUCT INFORMATION

Larry Bird and Dr. J Go One-on-One
By Eric Hammond, with Julius (Dr. J) Erving and Larry Bird
Electronic Arts
2755 Campus Drive
San Mateo, CA 94403
(415) 571-7171
List Price: $40
Requires: Apple II, II Plus, or IIe; 48K RAM, one disk drive with DOS 3.3, one joystick required (a second is optional but highly recommended, as is an adapter to allow simultaneous use of two joysticks.

Wico Adapter
Wico
6400 West Gross Point Road
Niles, IL 60648
(800) 323-4014
in IL (312) 647-7500
List Price: $21.95
Comments: This unit plugs into the 16-pin game port and supports two Atari-style (DB9 plugs) joysticks.

Paddle-Adapple
Southern California Research Group
P.O. Box 2231
Goleta, CA 93118
(805) 685-1931
List Price: $29.95 for each version
Comments: Available in three versions: Regular—for two joysticks with 16-pin plugs (Apple II and II Plus; D—for two joysticks with DB9 plugs (Apple IIe or Atari-style); and Combo—supports one joystick of each type.

Select-a-Port
TG Products
P. O. Box 2931
Richardson, TX 75080
(214) 424-8568
List Price: $39.95
Comments: Provides five 16-pin sockets, two of which support joysticks.

Mockingboard Sound II
Sweet Micro Systems
150 Chestnut Street
Providence, RI 02903
(401) 461-0530
List Price: $124.95
Comments: The "Maple Leaf Rag" by Scott Joplin plays between games and in the Demo mode. Installs in slot 4.

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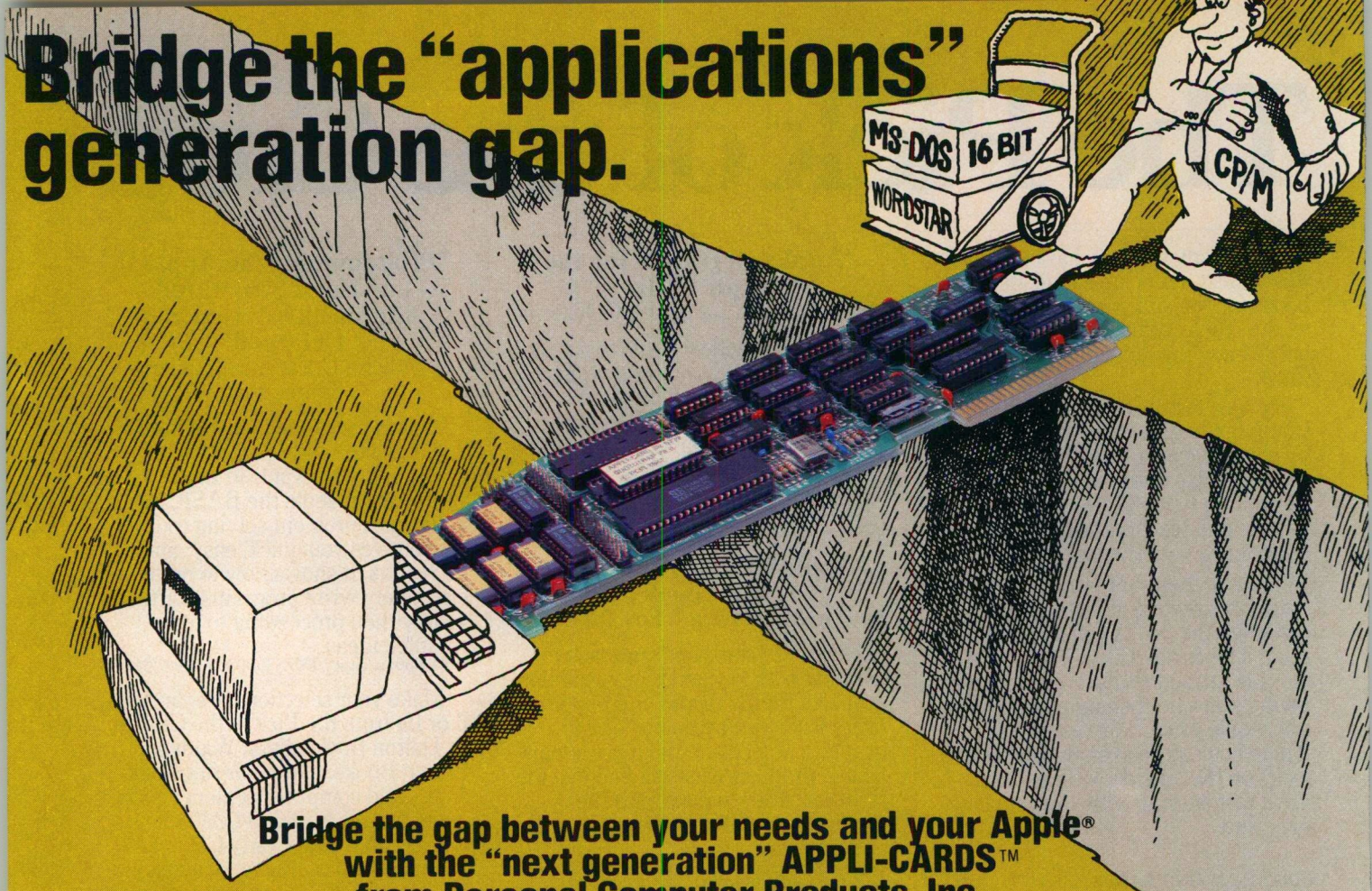

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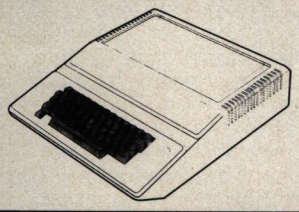

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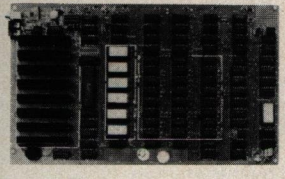

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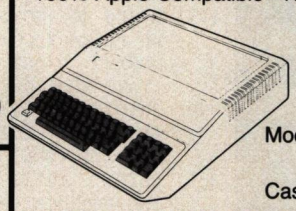

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Understanding F/Stops and Shutter Speeds

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BY BYRON EVERS

Congratulations to Byron Evers of Seminole, Oklahoma, the first winner of the *A+* Program of the Month contest! Mr. Evers' program teaches you how to use f/stops and shutter speeds, which are two important elements of photography.

At the end of the instructional part of the program is an optional quiz to help you find out how well you understood the lesson. Another reason for the quiz is that the author designed the program for photography students. Mr. Evers is chairman of the Seminole Junior College Photojournalism Department.

Remember to keep those contest entries coming in. Each month's winner will receive a $500 prize and will be in the running for the annual Grand Prize of $1000 and an *A+* statue of excellence. We welcome programs of 500 lines or less for any Apple computer. Each entry must be on disk and must include a one-page description. Also, watch for the winning programs in *A+ Disk* magazine, ready to run. For full contest details, see the editorial on page 9 of the April 1984 issue of *A+*.

```
1  REM   MANUAL SLR
2  REM   BY BYRON EVERS
3  REM   1203 HARDING;  SEMINOLE,
     OKLA. 74868 (405) 382-3204
4  REM   NOVEMBER 29, 1983
10  SPEED= 200:SEC = 4: GOTO 60
20  HOME : VTAB 2: RETURN
30  FOR T = 1 TO 700 * SEC: NEXT
     T: RETURN
40  HOME : FLASH : FOR T = 1 TO 2
     4: VTAB (T): HTAB (T): PRINT
     "GREAT": NEXT T: FOR T = 24 TO
     1 STEP  - 1: HTAB (T): PRINT
     "GREAT": NEXT T: NORMAL : RETURN

50  VTAB 23: PRINT "PRESS 'RETURN
     ' TO CONTINUE.";: POKE  - 16
     368,0: GET Z$: PRINT : RETURN

51  POKE  - 16368,0
52  IF  PEEK ( - 16384) < 128 THEN
     52
53 B$ =  CHR$ ( PEEK ( - 16384) -
     128): RETURN
60  GOSUB 20: PRINT : PRINT "HI T
     HERE SHUTTERBUG!": PRINT : PRINT
     "WHAT IS YOUR NAME?": VTAB 1
     0: PRINT "(GO AHEAD. TYPE YO
     UR NAME,": PRINT : PRINT "AN
     D PRESS RETURN)"
64  INPUT A$: GOSUB 20
65  PRINT : PRINT "GLAD TO MEET Y
     OU ";A$;". THEY": PRINT : PRINT
     "CALL ME APPLE.  SOME PEOPLE
      THINK I AM": PRINT : PRINT
     "A COMPUTER, BUT ACTUALLY TH
     E APPLE HAS": PRINT : PRINT
     "BEEN AROUND SINCE ADAM AND
     EVE!"
66  PRINT : PRINT : PRINT : PRINT
     "THAT'S A VERY OLD JOKE!": PRINT
     : PRINT "ANYWAY, ";A$;", I U
     NDERSTAND": PRINT : PRINT "T
     HAT YOU ARE INTERESTED IN PH
     OTOGRAPHY.": GOSUB 50: GOSUB
     20
110  PRINT : PRINT "WELL, IF YOU
     ARE READY,": PRINT : PRINT "
     LET'S GET STARTED.": PRINT :
      PRINT "(PRESS RETURN TO BEG
     IN.)"
199  GOSUB 50: GOSUB 20: PRINT "O
     UR PRIMARY GOAL WITH THIS PR
     OGRAM": PRINT : PRINT "IS TO
      TAKE SOME OF THE MYSTERY"
200  PRINT : PRINT "OUT OF A MANU
     AL SINGLE LENS": PRINT : PRINT
     "REFLEX (SLR) CAMERA SO"
201  PRINT : PRINT "THAT A BEGINN
     ING PHOTOGRAPHER CAN": PRINT
     : PRINT "UNDERSTAND THE BASI
     CS.": GOSUB 50: GOSUB 20
205  PRINT : PRINT "WE ARE GOING
     TO BE LOOKING AT THE": PRINT
     : PRINT "PARTS OF A SLR, AND
      FOCUS IN ON THE": PRINT : PRINT
     "TWO MAIN MANUAL CONTROLS:":
      PRINT : PRINT "F/STOPS AND
     SHUTTER SPEEDS."
206  GOSUB 50: GOSUB 20
210  PRINT : PRINT "THE OBJECTIVE
      IS:": PRINT : PRINT : PRINT
     "GIVEN VARIOUS LIGHTING AND"
     : PRINT : PRINT "SUBJECT SIT
     UATIONS, THE STUDENT"
211  PRINT : PRINT "WITH 80 PERCE
     NT ACCURACY WILL BE": PRINT
     : PRINT "ABLE TO SELECT CORR
     ECT F/STOPS AND": PRINT : PRINT
     "SHUTTER SPEEDS FOR MANUAL S
     INGLE LENS": PRINT : PRINT "
     REFLEX CAMERAS."
215  GOSUB 50: GOSUB 20
460  PRINT : PRINT "ALL MANUAL SL
     R CAMERAS HAVE THE ": PRINT
     : PRINT "F/STOP CONTROLS ON
     THE LENS."
461  GOSUB 50: GOSUB 20
465  VTAB 10: HTAB 3: PRINT "F/ST
     OP = APERTURE = LENS OPENING
     "
466  GOSUB 50: GOSUB 20
470  PRINT "YOU CAN INCREASE OR":
      PRINT : PRINT "DECREASE THE
      LIGHT BY CHANGING": PRINT :
      PRINT "F/STOPS AND SHUTTER
     SPEEDS."
475  PRINT : PRINT "THE HIGHER TH
     E F/STOP NUMBER,": PRINT : PRINT
     "THE LESS LIGHT HITS THE FIL
     M.": PRINT : PRINT "AS YOU S
     TEP FROM ONE F/ TO THE NEXT"
     : PRINT : PRINT "LOWER F/ YO
     U DOUBLE THE LIGHT."
476  GOSUB 50: GOSUB 20
485  PRINT "THE STANDARD F/STOPS
     ARE": PRINT : PRINT "F/16,
      F/11,   F/8,   F/5.6,   F/4
     ,": PRINT : PRINT "F/2.8,
     F/2,   F/1.4.": GOSUB 50: GOSUB
     20
490  PRINT "F/11 WILL ALLOW TWICE
      AS MUCH LIGHT": PRINT : PRINT
     "AS F/16.  F/5.6 WILL ALLOW
     TWICE AS": PRINT : PRINT "MU
     CH LIGHT AS F/8."
491  GOSUB 50: GOSUB 20: PRINT :PRINT
     "IF YOU HAD TO ALLOW MORE LI
     GHT TO": PRINT : PRINT "PROP
     ERLY EXPOSE YOUR FILM, WHICH
      WOULD": PRINT : PRINT "YOU
     SELECT IF YOU WERE AT F/8?"
492  PRINT : PRINT : PRINT "(1) F
     /11": PRINT : PRINT "(2) F/5
     .6": PRINT : PRINT "(3) F/16
     ": PRINT : PRINT : PRINT "(P
     RESS THE CORRECT NUMBER)"
494  GOSUB 51: IF B$ < "1" OR B$ >
     "3" THEN 494
495  IF B$ = "2" THEN  GOSUB 40: GOTO
     499
496  GOSUB 20: PRINT "SORRY. LET'
     S LOOK AGAIN.":SEC = 3: GOSUB
     30: GOTO 475
499  GOSUB 20
500  PRINT : PRINT "THE SAME GOES
      FOR ANY OF THE VARIOUS": PRINT
     : PRINT "COMBINATIONS. REMEM
     BER, IF YOU WANT": PRINT : PRINT
     "TO GIVE THE FILM TWICE AS M
     UCH LIGHT": PRINT : PRINT "G
     O TO THE NEXT LOWER F/."
501  PRINT : PRINT "YOU CAN STOP
     DOWN ON THE AMOUNT OF": PRINT
     : PRINT "LIGHT BY GOING TO T
     HE NEXT HIGHER F/."
505  GOSUB 50: GOSUB 20
510  PRINT "FOR EXAMPLE, YOU WILL
      CUT THE LIGHT": PRINT : PRINT
     "IN HALF IF YOU MOVE FROM F/
     8 TO F/11."
511  PRINT : PRINT "YOU CAN MOVE
     MORE THAN ONE SETTING": PRINT
     : PRINT "AT A TIME IF NECESS
     ARY. LET'S SAY YOU": PRINT :
      PRINT "WANT TO CUT THE LIGH
     T IN ONE FOURTH,": PRINT : PRINT
     "THEN GO FROM F/8 TO F/16."
512  GOSUB 50: GOSUB 20: PRINT "I
     F YOU WANTED GIVE THE FILM T
     WICE AS": PRINT : PRINT "MUC
     H LIGHT AND YOU ARE ON F/4,
```

```
    WHAT": PRINT : PRINT "SETTIN
    G WOULD YOU USE?"
513 PRINT : PRINT "(A) = F/16": PRINT
    : PRINT "(B) = F/2.8": PRINT
    : PRINT "(C) = F/5.6": PRINT
    : PRINT : PRINT : PRINT "(EN
    TER THE CORRECT LETTER)"
514 GOSUB 51: IF B$ < "A" OR B$ >
    "C" THEN 514
515 IF B$ = "B" THEN  GOSUB 40: GOTO
    522
516 GOSUB 20: PRINT "CONFUSING?
    ";A$;",": PRINT : PRINT "LET
    'S GO BACK AND TAKE ANOTHER
    LOOK.":SEC = 3: GOSUB 30: GOTO
    475
522 GOSUB 20: VTAB 10: HTAB 2: PRINT
    "SHUTTER SPEEDS = FRACTIONS
    OF A SECOND": GOSUB 50: GOSUB
    20
523 PRINT "THE SAME PRINCIPLE WO
    RKS WITH THE": PRINT : PRINT
    "CAMERA SHUTTER SPEEDS. AS Y
    OU MOVE FROM": PRINT : PRINT
    "ONE SHUTTER SPEED TO THE NE
    XT FASTER": PRINT : PRINT "S
    ETTING, YOU CUT THE LIGHT IN
     HALF."
524 GOSUB 50: GOSUB 20
525 PRINT "THE COMMON SHUTTER SP
    EEDS ARE": PRINT : PRINT "IN
     FRACTIONS OF A SECOND: 1/10
    00,": PRINT : PRINT "1/500,
    1/250, 1/125, 1/60, 1/30.":
530 VTAB 10: PRINT "THERE ARE SL
    OWER SETTINGS, BUT": PRINT :
     PRINT "THE CAMERA SHOULD BE
     ON A TRIPOD IF": PRINT : PRINT
    "YOU SHOOT PICTURES SLOWER T
    HAN": PRINT : PRINT "1/30 OF
     A SECOND.": GOSUB 50: GOSUB
    20
535 VTAB 12: HTAB 12: FLASH : PRINT
    "WHY HAVE THEM?": FOR I = 1 TO
    1400: NEXT I: NORMAL : GOSUB
    50: GOSUB 20
540 PRINT "THERE ARE SEVERAL REA
    SONS WHY": PRINT : PRINT "AD
    VANCED AMATEUR PHOTOGRAPHERS
     AND": PRINT : PRINT "PROFES
    SIONALS WANT TO CONTROL THE"
    : PRINT : PRINT "F/STOPS AND
     SHUTTER SPEEDS."
545 PRINT : PRINT "YOU HAVE PROB
    ABLY SEEN SOME PICTURES": PRINT
    : PRINT "THAT HAD A VERY SHA
    RP CENTRAL POINT": PRINT : PRINT
    "OF INTEREST, BUT A BLURRED
    BACKGROUND": PRINT : PRINT "
    OR FOREGROUND."
550 GOSUB 50: GOSUB 20
555 PRINT "THIS IS CALLED SHALLO
    W DEPTH OF FIELD.": PRINT :PRINT
    "IT OCCURS WHEN THE PHOTOGRA
    PHER": PRINT : PRINT "SELECT
    S A LOW F/STOP SUCH AS 1.4,"
    : PRINT : PRINT "2, 2.8, 4 O
    R 5.6."
560 PRINT : PRINT "THE CLOSER YO
    U ARE TO YOUR SUBJECT,": PRINT
    : PRINT "THE WORSE (MORE BLU
    RRED) THE": PRINT : PRINT "F
    OREGROUND AND BACKGROUND WIL
    L BE.":
561 GOSUB 50: IF FL = 1 THEN 710

564 GOSUB 20
565 PRINT "BY USING SHALLOW DEPT
    H OF FIELD, THE": PRINT : PRINT
    "PHOTOGRAPHER CAN MAKE THE M
    AIN SUBJECT": PRINT : PRINT
    "STAND OUT BY BEING SHARPLY
    FOCUSED."
570 PRINT : PRINT "SOMETIMES, HO
    WEVER, YOU MAY WANT": PRINT
    : PRINT "EVERYTHING TO BE VE
    RY SHARP IN THE": PRINT : PRINT
    "PICTURE. IF SO, THEN USE A
    HIGH": PRINT : PRINT "F/STOP
     NUMBER SUCH AS F/16 OR F/11
    ."
575 GOSUB 50: GOSUB 20
580 PRINT "A PICTURE THAT HAS EV
    ERYTHING (MAIN": PRINT : PRINT
    "SUBJECT AS WELL AS FOREGROU
    ND AND": PRINT : PRINT "BACK
    GROUND) IN SHARP FOCUS HAS G
    REAT": PRINT : PRINT "DEPTH
    OF FIELD."
585 PRINT : PRINT "YOU MIGHT WAN
    T TO USE GREAT DEPTH": PRINT
    : PRINT "OF FIELD ON A SCENI
    C PICTURE OF": PRINT : PRINT
    "A MOUNTAIN.": GOSUB 50: GOSUB
    20
586 PRINT : PRINT "TO GET GREAT
    DEPTH OF FIELD IN A": PRINT
    : PRINT "TEAM PHOTOGRAPH OF
    SEVERAL ROWS OF": PRINT : PRINT
    "FOOTBALL PLAYERS, WHICH SET
    TING WOULD": PRINT : PRINT "
    YOU SELECT?"
587 PRINT : PRINT "(1) F/2.8": PRINT
    : PRINT "(2) F/8": PRINT : PRINT
    "(3) F/11": PRINT : PRINT : PRINT
    "ENTER THE CORRECT NUMBER (1
    , 2 OR 3)"
588 GOSUB 51: IF B$ < "1" OR B$ >
    "3" THEN 588
589 IF B$ = "3" THEN  GOSUB 40: GOTO
    593
590 GOSUB 20: PRINT "SORRY. LET'
    S CHECK THAT OUT AGAIN.":SEC
     = 3: GOSUB 30: GOTO 570
593 GOSUB 20
594 PRINT "IF YOU WANT TO SHOOT
    A MOVING OBJECT,": PRINT : PRINT
    "AND NOT HAVE IT BLURRED, YO
    U MUST USE": PRINT : PRINT "
    FAST SHUTTER SPEEDS SUCH AS
    1/1000": PRINT : PRINT "1/50
    0 OR 1/250."
595 PRINT : PRINT "FOR EXAMPLE,
    YOU WOULD WANT TO SHOOT": PRINT
    : PRINT "A BASKETBALL GAME W
    ITH AT LEAST 1/250TH": PRINT
    : PRINT "OF A SECOND TO STOP
     THE ACTION."
600 GOSUB 50: GOSUB 20
610 PRINT "SOMETIME YOU MAY WANT
     TO SHOOT A ": PRINT : PRINT
    "PAN SHOT, WHERE THE MOVING
    SUBJECT IS": PRINT : PRINT "
    SHARP AND THE BACKGROUND BLU
    RRED."
615 PRINT : PRINT "YOU CAN DO TH
    IS BY USING A SLOW": PRINT :
     PRINT "SHUTTER SPEED SUCH A
    S 1/30TH OF A": PRINT : PRINT
    "SECOND, AND KEEPING THE SUB
    JECT": PRINT : PRINT "CENTER
    ED IN THE VIEWFINDER WHILE":

618 PRINT : PRINT "MOVING THE CA
    MERA.": GOSUB 50: IF FL = 1 THEN
    684
620 GOSUB 20
625 PRINT : PRINT "MOST SLR CAME
    RAS HAVE A BUILT IN": PRINT
    : PRINT "LIGHT METER TO HELP
     YOU GET A PROPER": PRINT : PRINT
    "EXPOSURE FOR YOUR FILM.":
630 PRINT : PRINT : PRINT "YOU C
    AN ALSO BUY INEXPENSIVE": PRINT
    : PRINT "HAND HELD LIGHT MET
    ERS OR USE THE": PRINT : PRINT
    "SUGGESTIONS INCLUDED WITH T
    HE FILM."
635 PRINT : PRINT "KEEP IN MIND
    SOME OF THE THINGS WE": PRINT
    : PRINT "HAVE BEEN DISCUSSIN
    G WHEN YOU PICK THE": PRINT
    : PRINT "F/STOPS AND SHUTTER
     SPEEDS."
640 GOSUB 50: GOSUB 20
645 PRINT : PRINT "REMEMBER, YOU
     CANNOT JUST REACH OUT": PRINT
    : PRINT "AND GRAB THE SETTIN
    GS WITHOUT MAKING": PRINT :PRINT
    "SURE YOU ARE PROPERLY EXPOS
    ING": PRINT : PRINT "THE FIL
    M."
647 PRINT : PRINT "IF YOU TAKE A
    WAY OR ADD LIGHT WITH": PRINT
    : PRINT "ONE F/STOP OR SHUTT
    ER SPEED,": PRINT : PRINT "Y
    OU MUST DO THE OPPOSITE WITH
     THE": PRINT : PRINT "OTHER
    SETTING."
648 GOSUB 50: GOSUB 20: PRINT :PRINT
    "FOR EXAMPLE:": PRINT : PRINT
    "IF YOU ADD LIGHT WITH THE F
    /STOP,": PRINT : PRINT "THEN
     TAKE AWAY LIGHT WITH THE": PRINT
    : PRINT "SHUTTER SPEED SETTI
    NG."
649 PRINT : PRINT "OR, IF YOU TA
    KE AWAY LIGHT WITH THE": PRINT
    : PRINT "SHUTTER SPEED SETTI
    NG, THEN ADD LIGHT": PRINT :
     PRINT "WITH THE F/STOP."
650 GOSUB 50: GOSUB 20
651 PRINT : PRINT "THE MAIN THIN
    G IS TO SELECT WHAT IS": PRINT
    : PRINT "MOST IMPORTANT (SHU
    TTER SPEED OR": PRINT : PRINT
    "F/STOP), THEN CHANGE THE SE
    TTTINGS TO": PRINT : PRINT "
    GET A PROPER EXPOSURE."
653 GOSUB 50: GOSUB 20
655 VTAB 6: PRINT "IF YOUR LIGHT
     METER READS 1/60 AT": PRINT
    : PRINT "F/8 AND YOU WANT TO
     STOP THE ACTION,": PRINT :PRINT
    "WHAT IS MOST IMPORTANT?"
658 PRINT : PRINT "(A) SHUTTER S
    PEED": PRINT : PRINT "(B) F/
    STOPS"
665 GOSUB 51: IF B$ < "A" OR B$ >
    "B" THEN 665
666 IF B$ = "A" THEN  GOSUB 40: GOTO
    675
667 GOSUB 20: PRINT "SORRY. LET'
    S LOOK AGAIN.": PRINT :SEC =
    3: GOSUB 30: GOTO 594
675 GOSUB 20
680 PRINT : PRINT "YOU ARE DOING
     GREAT!": PRINT : PRINT "LET
    'S TRY A FEW MORE SITUATIONS
    .": GOSUB 50
684 GOSUB 20
685 PRINT : PRINT "IF YOUR LIGHT
     METER READS 1/60": PRINT :PRINT
    "AT F/8, AND YOU WANT TO PAN
     THE ACTION,": PRINT : PRINT
    "USE F/11 AT:"
688 PRINT : PRINT "(A) 1/250": PRINT
    : PRINT "(B) 1/30": PRINT :PRINT
    "(C) F/2"
695 GOSUB 51: IF B$ < "A" OR B$ >
    "C" THEN 695
696 IF B$ = "B" THEN  GOSUB 40: GOTO
    710
```

```
697  GOSUB 20: PRINT "GETTING CON
     FUSED?": PRINT : PRINT "LET'
     S REVIEW.": PRINT :SEC = 3:GOSUB
     30:FL = 1: GOTO 610
700  GOSUB 20: PRINT : PRINT "GET
     TING CONFUSED?": PRINT : PRINT
     "LET'S REVIEW.": PRINT : GOSUB
     30:FL = 1: GOTO 610
710  GOSUB 20
715  PRINT : PRINT "IF YOU WANT T
     O SHOOT A PICTURE OF A": PRINT
     : PRINT "BIRD'S NEST AND MAK
     E THE BABY BIRDS": PRINT : PRINT
     "STAND OUT BY BLURING THE TR
     EE LIMBS":
718  PRINT : PRINT "WITH SELECTIV
     E FOCUS, WHICH OF THE": PRINT
     : PRINT "FOLLOWING IS IMPORT
     ANT?"
720  PRINT : PRINT "(A) A LOW F/S
     TOP NUMBER": PRINT : PRINT "
     (B) A HIGH F/STOP NUMBER": PRINT
     : PRINT "(C) A FAST SHUTTER
     SPEED": PRINT : PRINT "(D) A
      SLOW SHUTTER SPEED."
725  GOSUB 51: IF B$ < "A" OR B$ >
     "D" THEN 725
726  IF B$ = "A" THEN  GOSUB 40: GOTO
     729
727  GOSUB 20: PRINT "NOPE.": PRINT
     : PRINT "LET'S LOOK AT DEPTH
      OF FIELD AGAIN.": PRINT :SE
     C = 3: GOSUB 30:FL = 1: GOTO
     545
728  GOSUB 20: PRINT : PRINT "NOP
     E.": PRINT : PRINT "LET'S LO
     OK AT DEPTH OF FIELD AGAIN."
     : PRINT : GOSUB 30:FL = 1: GOTO
     545
729  GOSUB 20
780  PRINT : PRINT : FLASH : PRINT
     "EXCELLENT ";A$;"!": NORMAL

781  PRINT : PRINT : PRINT "YOU N
     OW KNOW HOW TO USE THE MOST"
     : PRINT : PRINT "IMPORTANT C
     ONTROLS - F/STOPS AND": PRINT
     : PRINT "SHUTTER SPEEDS - ON
      A MANUAL CAMERA."
782  PRINT : PRINT "CHECK WITH YO
     UR INSTRUCTOR ON WHEN": PRINT
     : PRINT "YOU SHOULD SHOOT YO
     UR FIRST ROLL OF": PRINT : PRINT
     "FILM ON A MANUAL SLR."
787  GOSUB 50: GOSUB 20
788  PRINT : PRINT : PRINT "SELEC
     T ONE OF THE FOLLOWING OPTIO
     NS:": PRINT : PRINT "(A) GO
     THROUGH THE PROGRAM AGAIN.":
      PRINT : PRINT "(B) PROCEED
     WITH THE TEST."
790  POKE  - 16368,0: GET B$: PRINT
     : IF B$ = "A" THEN SEC = 4:GOSUB
     30: RUN
800  PRINT  CHR$ (4);"RUNTEST"



1    REM   TEST MANUAL SLR
2    REM   BY BYRON EVERS
3    REM   DECEMBER 29, 1983
5    REM  TW = TOTAL WRONG
6    REM  T  = TOTAL NUMBER OF QUES
     TIONS ASKED
10   HOME : VTAB (2)
20   HTAB 10: PRINT : PRINT "INSTR
     UCTIONS": PRINT : PRINT : PRINT
     "READ EACH QUESTION CAREFULL
     Y BEFORE": PRINT : PRINT "BE
     FORE ANSWERING. SELECT THE O
     NE BEST": PRINT : PRINT "ANS
     WER AND ENTER IT'S CORRESPON
     DING": PRINT : PRINT "NUMBER
     ."
25   PRINT :
30   PRINT "(A) SELECT THE BEST AN
     SWER"
32   PRINT "(B) TYPE ITS NUMBER"
34   PRINT "(C) PRESS 'RETURN'"
36   GOSUB 1000
39   HOME : VTAB (2): PRINT "IF YO
     U WANT TO GIVE MORE EXPOSURE
     ": PRINT : PRINT "(AMOUNT OF
      LIGHT HITTING THE FILM),":PRINT
     : PRINT "THEN YOU SHOULD:"
40   PRINT : PRINT : PRINT
41   PRINT "(1) CHANGE TO A SMALLE
     R F/STOP NUMBER.": PRINT : PRINT
     "(2) CHANGE TO A LARGER F/ST
     OP NUMBER."
42   PRINT : PRINT "(3) CHANGE TO
     A SLOWER SHUTTER SPEED.": PRINT
     : PRINT "(4) CHANGE TO A FAS
     TER SHUTTER SPEED."
43   PRINT : PRINT "(5) DO (2) AND
     /OR (4).": PRINT : PRINT "(6
     ) DO (1) AND/OR (3)."
44   PRINT : PRINT : INPUT A:AN =
     6: GOSUB 2000
49   HOME : VTAB (2): PRINT "IF YO
     U WANT TO DOUBLE THE EXPOSUR
     E": PRINT : PRINT "OF F/8, T
     HEN USE:": PRINT : PRINT : PRINT

50   PRINT "(1) F/16"
51   PRINT : PRINT "(2) F/5.6"
52   PRINT : PRINT "(3) F/4"
53   PRINT : PRINT "(4) 1/125"
60   PRINT : PRINT : INPUT A:AN =
     2: GOSUB 2000
70   HOME : VTAB (2): PRINT "IF YO
     U WANT TO DOUBLE THE EXPOSUR
     E": PRINT : PRINT "OF 1/250T
     H OF A SECOND, THEN USE": PRINT
     : PRINT : PRINT
71   PRINT "(1) 1/125"
72   PRINT : PRINT "(2) 1/500"
73   PRINT : PRINT "(3) 1/100"
74   PRINT : PRINT "(4) F/16"
80   PRINT : PRINT : INPUT A:AN =
     1: GOSUB 2000
85   HOME : VTAB (2): PRINT "IF YO
     U WANT TO HAVE GREAT DEPTH O
     F": PRINT : PRINT "FIELD TO
     HAVE EVERYTHING IN SHARP": PRINT
     : PRINT "FOCUS ACROSS THE MO
     UNTAIN RANGE, USE"
86   PRINT : PRINT : PRINT "(1) F/
     2"
87   PRINT : PRINT "(2) 1/1000"
88   PRINT : PRINT "(3) F/8"
89   PRINT : PRINT "(4) F/16"
90   PRINT : PRINT : INPUT A:AN =
     4: GOSUB 2000
100  HOME : VTAB (2): PRINT "IF Y
     OUR LIGHT METER READS 1/125
     AT": PRINT : PRINT "F/8, AND
      YOU WANT TO PAN THE ACTION,
     ": PRINT : PRINT "YOU SHOULD
      USE"
101  PRINT : PRINT : PRINT "(1) 1
     /250 AT F/16"
102  PRINT : PRINT "(2) 1/1000 AT
      F/2"
103  PRINT : PRINT "(3) 1/30 AT F
     /16"
104  PRINT : PRINT "(4) GIVE UP!"
106  PRINT : PRINT : INPUT A:AN =
     3: GOSUB 2000
110  HOME : VTAB (2): PRINT "IF Y
     OUR LIGHT METER READS 1/60 A
     T F/16": PRINT : PRINT "AND
     YOU WANT TO STOP THE ACTION
     AT": PRINT : PRINT "THE BASE
     BALL GAME, USE"
111  PRINT : PRINT : PRINT "(1) 1
     /500 AT F/5.6"
112  PRINT : PRINT "(2) 1/500 AT
     F/16"
113  PRINT : PRINT "(3) 1/60 AT F
     /5.6"
114  PRINT : PRINT "(4) BUY AN IN
     STAMATIC!"
116  PRINT : PRINT : INPUT A:AN =
     1: GOSUB 2000
120  HOME : VTAB (2): PRINT "YOUR
      SHUTTER SPEED IS SET AT 1/6
     0.": PRINT : PRINT "TO DOUBL
     E THE EXPOSURE, YOU WILL USE
     "
121  PRINT : PRINT : PRINT "(1) 1
     /80": PRINT : PRINT "(2) 1/5
     00": PRINT : PRINT "(3) 1/30
     ": PRINT : PRINT "(4) F/16"
126  PRINT : PRINT : INPUT A:AN =
     3: GOSUB 2000
130  HOME : VTAB (2): PRINT "YOUR
      F/STOP IS SET AT F/5.6.": PRINT
     : PRINT "TO CUT THE LIGHT IN
      HALF, USE:"
131  PRINT : PRINT : PRINT "(1) F
     /16": PRINT : PRINT "(2) F/8
     ": PRINT : PRINT "(3) F/2"
132  PRINT : PRINT "(4) A VERY SH
     ARP KNIFE"
133  PRINT : PRINT : INPUT A:AN =
     2: GOSUB 2000
134  HOME : VTAB (2): PRINT "TO I
     NCREASE DEPTH OF FIELD, YOU
     SHOULD:": PRINT : PRINT : PRINT

135  PRINT "(1) USE FASTER SHUTTE
     R SPEEDS.": PRINT : PRINT "(
     2) USE SLOWER SHUTTER SPEEDS."
136  PRINT : PRINT "(3) USE SMALL
     ER F/STOP NUMBERS.": PRINT :
      PRINT "(4) USE LARGER F/STO
     P NUMBERS."
137  PRINT : PRINT : INPUT A:AN =
     4: GOSUB 2000
160  HOME : VTAB (2): PRINT "TO S
     TOP THE ACTION AT A STOCK CA
     R": PRINT : PRINT "RACE, YOU
      SHOULD"
161  PRINT : PRINT : PRINT "(1) U
     SE HIGH F/STOPS": PRINT : PRINT
     "(2) USE SLOW SHUTTER SPEEDS
     ": PRINT : PRINT "(3) USE FA
     ST SHUTTER SPEEDS"
162  PRINT : PRINT "(4) THROW NAI
     LS ON THE TRACK"
166  PRINT : PRINT : INPUT A:AN =
     3: GOSUB 2000
600  HOME : VTAB (2)
610  PRINT "YOU MISSED ";TW;" QUE
     STIONS": PRINT "OUT OF A TOT
     AL OF ";T;"."
620  PRINT : PRINT : PRINT "THE P
     ERCENTAGE SCORE IS "; INT ((
     T - TW) / T * 100);"%"
640  FOR I = 1 TO 4000: NEXT I
660  PRINT : PRINT : PRINT : PRINT
     "WRITE THIS DOWN AND GIVE IT
      TO": PRINT "YOUR TEACHER.":
      PRINT : PRINT "SEE YOU AGAI
     N SOON!!!"
670  GOSUB 1000: RUN
1000  VTAB (23): INPUT "PRESS 'RE
     TURN' TO GO ON.";Z$: RETURN
2000 T = T + 1
2010  IF A <  > AN THEN TW = TW +1
2020  RETURN
```

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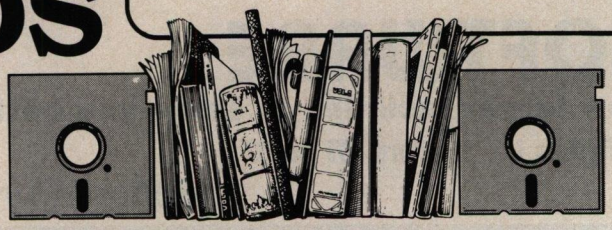

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HOW TO dBASE II

PART IX

In a tutorial series on dBase II, a popular program for database management

Welcome to our ongoing series of tutorials on the increasingly popular microcomputer data-management tool dBASE II. If you have been following along through the last eight installments in *A+*, you should now be fairly adept in many of the rudimentary, as well as some of the more complex, techniques for creating databases, storing information in them, and keeping that information up to date. We've also covered most of the approaches for data retrieval, including the use of sorted and indexed databases, types of "operators," memory variables, some "functions," and commands that accomplish large-scale modifications of and interactions between existing data files.

This time, we'll learn to take advantage of dBASE's ability to open and work with two data files simultaneously. But first, a few notes to newcomers:

Tutorial Conventions

These tutorials contain many examples. Sometimes I ask you to type in a command, and then dBASE II responds. Just to differentiate between what you do and what dBASE II responds with, the lowercase words are the ones you type. Uppercase works too, so it doesn't really make a difference—it's just clearer this way. Some examples may specifically ask you to type uppercase letters, but these cases always involve a series of words between quotes. The dBASE II responses are usually in uppercase letters. All screen interactions are in different type to distinguish them from the text.

To make these sections more readable, carriage returns are implied rather than included.

In the command-syntax examples, words between square brackets (e.g., [scope]) indicate an optional phrase or "argument."

How Can You Be Two Places at Once?

Have you ever needed to have more than one dBASE II data file open at one time? Such a situation is not uncommon in complex applications. For example, say you have a mailing-list file in which you would like to include fairly long comments about only some of the people. As you may remember from past articles, dBASE II does not utilize disk space very efficiently. Empty fields consume just as much disk space as full ones do. So, if you included a long character field in your mailing-list structure, you might run out of storage space if your database grew large enough.

Why not use a second database to store the occasional comments in, with some type of referencing scheme for associating the names with their respective comments? This approach requires only the addition of a one-character logical field to indicate the presence of comments relating to any person. If you type a T or Y into this field, you'll know that you *should* look in the other database for comments. (You

```
. use phonebk
. disp structure

STRUCTURE FOR FILE:  A:PHONEBK .DBF
FLD                    NAME                TYPE          WIDTH          DEC
001                FIRST:NAME                C             010
002                LAST:NAME                 C             015
003                STREET                    C             020
004                CITY                      C             012
005                STATE                     C             002
006                NOTES                     L             001

. list

00001    JIM          JORDAN        3489 HARRIS              KENSINGTON     CA .T.
00002    REGINALD     HUMPHRIES     45 MAGNOLIA COURT        RESTON         VA .T.
00003    GERRY        ABSTRACT      99 9th AVE. WEST         COLUMBUS       OR .F.
00004    MARY         STUART        1902 APPLE LANE          BETHPAGE       NY .F.
00005    MARK         COHEN         33 PLAYWRIGHT CIRCLE     HOBOKEN        NJ .F.

. use notefile
. display structure

STRUCTURE FOR FILE:  A:NOTEFILE.DBF
FLD                    NAME                TYPE          WIDTH      DEC
001                REC:NUM                   N             005
002                NOTES                     C             050

. list

00001    1 Jim is a very good wing-nut manufacturer.
00002    2 Studies poststructuralist controversy.
00003    5 Mark Cohen is a wormologist in NY.
```

Figure 1: Creating two new databases

can choose from several ways to match up the comments with the names, but more on that later.)

Here is where the dual-database idea comes into play: You can, using memory variables, temporarily store a reference in the computer about the record of the person whose comments you want to see. Then you can close the mailing-list database, open the comments database, and, using the memory-variable information, find the record that contains the comments associated with the person in the mailing list. There's a catch, though.

Opening and closing database files are not quick operations. dBASE II has to do some file maintenance each time it closes a file. It counts the number of records in the file, puts in an EOF (end of file) marker, writes any changed or appended records to disk, and updates the "header" at the beginning of the file before closing a file. Opening a file is a little faster, but not much. Obviously, opening and closing files repetitiously is something to try to avoid, especially when speed is a concern.

Luckily, dBASE II offers a way around this quandary. Two commands, Select Primary and Select Secondary, come to the rescue. In order to do a little experimentation, please create the two databases in figure 1 and try the commands in order to check the data.

OK, now that you have entered your data, let's use a command from a past installment of this tutorial. Remember the Display Status command? Type it now:

```
.display status

DATABASE SELECTED- A:PHONEBK.DBF
PRIMARY USE DATABASE
```

In the past, you might not have given much attention to the details of this message, but now they become relevant, as they deal with the Primary and Secondary commands.

The first line indicates which of the two databases dBASE II is currently "looking at," which one it has selected. Any commands you give dBASE (e.g., Edit, Append) apply only to the selected Database. Normally, we don't even have to consider which database is in use, since we usually use only one at a time.

Notice the phrase "primary use database"? If you decide to have two databases open simultaneously, dBASE needs a way of keeping track of which one is which. One will be assigned the name "primary" and the other one "secondary." Rather obvious, isn't it? If not, the meaning will become clearer once we open a "secondary use database" with the following commands:

```
. select secondary
. use notefile
. display status

DATABASE SELECTED - A:NOTEFILE.DBF
SECONDARY USE DATABASE

UNSELECTED DATABASE - A:PEOPLE .DBF
PRIMARY USE DATABASE
```

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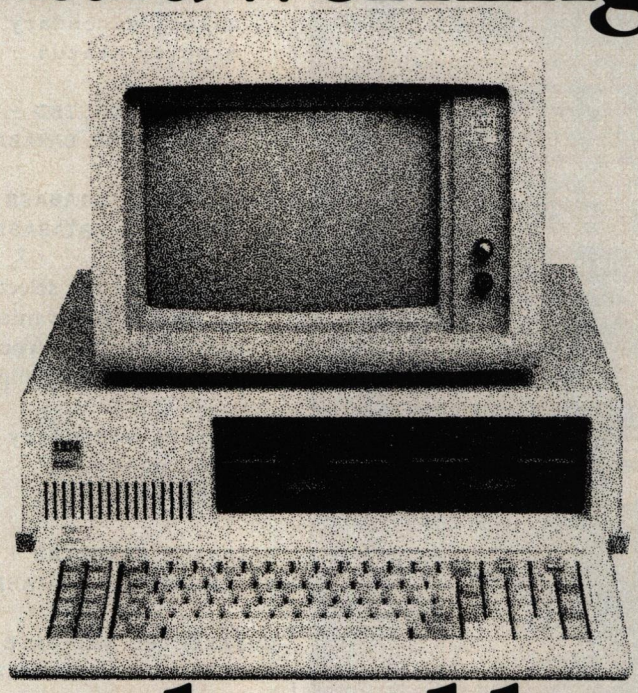

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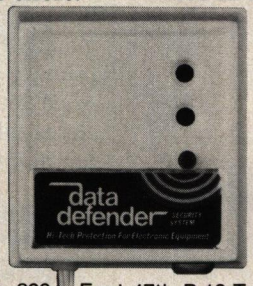

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Once again, the "primary" and "secondary" designations serve to distinguish between the two files that are currently open. Keep in mind, though, that dBASE II can only be cognizant of one file at a time, and the "unselected" and "selected" labels tell us which one any keyboard commands will actually reference.

Try selecting and deselecting the two areas and then displaying the status until you get the hang of it (remember, you have to use only the first four letters of a command):

```
. select primary
. display status

DATABASE SELECTED - A:PHONEBK .DBF
PRIMARY USE DATABASE

UNSELECTED DATABASE - A:NOTEFILE.DBF
SECONDARY USE DATABASE

. select secondary
. display status

DATABASE SELECTED - A:NOTEFILE.DBF
SECONDARY USE DATABASE

UNSELECTED DATABASE - A:PHONEBK .DBF
PRIMARY USE DATABASE
```

Notice that the selected database always appears first. Now, what if you wanted to change the secondary file to "inven." It's simple. You must select the area you want to assign a file to, then employ the Use command:

```
. select secondary
. use inven
. display status

DATABASE SELECTED - A:INVEN.DBF
SECONDARY USE DATABASE

UNSELECTED DATABASE -A:PHONEBK .DBF
PRIMARY USE DATABASE
```

(Of course, if no file named INVEN.DBF exists on your disk, dBASE II will let you know about it!)

What about opening a file and designating it as both the secondary and the primary file? Let's try it:

```
. select primary
. use phonebk
. select secondary
. use phonebk
DATABASE IS IN USE
```

Remember the cause of this message. It can drive you batty if you happen to open a secondary area and subsequently forget about it. Also, beware—closing databases in primary and secondary areas requires more diligence than when you work in the primary area only. Simply typing USE closes only the file in the selected area. Here is the procedure for closing all files:

```
. select secondary
. use
. select primary
. use
```

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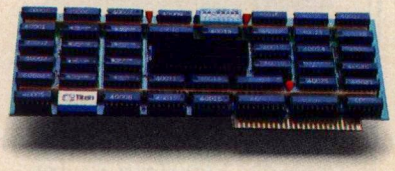

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A simpler way of closing files is to use the Clear command. This command closes *all* open files, wipes out all memory variables, and selects the primary database area. It may do more than you want done, so be careful.

You are probably wondering by now what happened to the name-and-address/notes example. With your new un-

```
. select primary
. list

00001    JIM          JORDAN       3489 HARRIS                KENSINGTON     CA .T.
00002    REGINALD     HUMPHRIES    45 MAGNOLIA COURT          RESTON         VA .T.
00003    GERRY        ABSTRACT     99 9th AVE. WEST           COLUMBUS       OR .F.
00004    MARY         STUART       1902 APPLE LANE            BETHPAGE       NY .F.
00005    MARK         COHEN        33 PLAYWRIGHT CIRCLE       HOBOKEN        NJ .F.

. select secondary
. list

00001      1 Reginald is a very good wing-nut manufacturer.
00002      2 Studies poststructuralist controversy.

. disp reco 2

00002    REGINALD     HUMPHRIES    45 MAGNOLIA COURT          RESTON         VA .T.

. select secondary
. disp for rec:num =2

00002      2 Studies poststructuralist controversy.
```

Figure 2: Using record numbers to access comments

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CIRCLE 159 ON READER SERVICE CARD

derstanding of the commands, let's give it a whirl. Look back at the note file and notice that the first field in each record begins with a number. This number is the number of the record in the Phonebk database to which the note refers. In order to make use of this connection, type the material in figure 2.

Get the picture? Of course, you could use indexes with each database, which would make things a lot easier. An index on last:name in the primary area and on rec:num in the secondary area would do it. Or better still, all the details could be handled by a dBASE II automatic program, details of which are still a few issues away.

Another nice feature of the dual-database design is the ability to reference data fields in either one. All you need is the prefix P. or S. before the field name. If you like living dangerously, field names may even be identical in the two files (the P. and S. will direct dBASE II to differentiate between them).

Figure 3 contains some examples to try. Study them carefully and notice that any commands, such as Skip, that cause movement of the dBASE II pointer affect only the selected database.

```
 . disp s.rec:num,p.first:name
00001       1 JIM

 . skip
RECORD: 00002

 . disp s.rec:num,p.first:name
00002       1 REGINALD

 . select secondary
 . skip
RECORD: 00002

 . disp s.rec:num,p.first:name
00002       2 REGINALD

 . disp p.first:name,p.last:name,s.notes
00002  REGINALD   HUMPHRIES      Studies poststructuralist controversy.
```

Figure 3: Using the P. and S. prefixes

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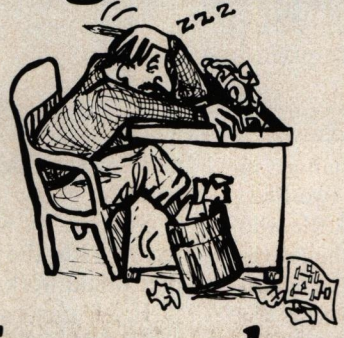

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```
 . goto 3
 . disp
00003          GERRY          ABSTRACT       99 9th AVE. WEST COLUMBUS       OR .F.
 . replace notes with T
00001 REPLACEMENT(S)
 . disp
00003          GERRY          ABSTRACT       99 9th AVE. WEST COLUMBUS       OR .T.
 . store # to x
3
 . select secondary
 . list
00001      1 Reginald is a very good wing-nut manufacturer.
00002      2 Studies poststructuralist controversy.
00003      5 Mark Cohen is a wormologist in NY.

 . append blank
 . list
00001      1 Reginald is a very good wing-nut manufacturer.
00002      2 Studies poststructuralist controversy.
00003      5 Mark Cohen is a wormologist in NY.
00004      0

 . replace rec:num with x
00001 REPLACEMENT(S)

 . list
00001      1 Reginald is a very good wing-nut manufacturer.
00002      2 Studies poststructuralist controversy.
00003      5 Mark Cohen is a wormologist in NY.
00004      3

.replace notes with "This guy is crazy about licorice macaroons."

 . list
00001      1 Reginald is a very good wing-nut manufacturer.
00002      2 Studies poststructuralist controversy.
00003      5 Mark Cohen is a wormologist in NY.
00004      3 This guy is crazy about licorice macaroons.
```

Figure 4: Using the Replace command with dual databases

You can also use the Replace command in this manner, in case you want to swap specific field data between two files. For example, if we add a new person to the Phonebk file who should have notes recorded in the Note file, we should replace the rec:num field in the secondary file with the actual record number of the primary file. The replacing process is a little tricky, because dBASE II can do a Replacement only on a field that is in the selected area. Once we select the primary area, the record number changes, so we have to use a memory variable to store the primary record's number temporarily.

Suppose we wanted to add notes about Gerry Abstract, record #3 in the primary area. See figure 4 to find out how that would work.

If you aren't using the record number as a reference point to the secondary file (which is a good idea, since packing the primary database would throw off all the references), replacing things is much simpler. Just get the pointers for each

```
 . select primary
 . goto 3
 . select secondary
 . goto 4
replace s.notes with p.first:name +p.last:name

00001 REPLACEMENT(S)
 . list
00001  1 Reginald is a very good wing-nut manufacturer.
00002  2 Studies poststructuralist controversy.
00003  5 Mark Cohen is a wormologist in NY.
00004  4 GERRY     ABSTRACT
```

Figure 5: Replacing information in record 4

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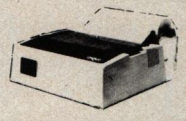

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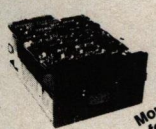

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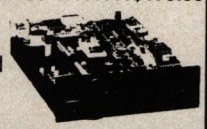

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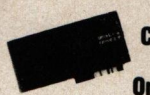

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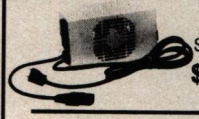

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CIRCLE 250 ON READER SERVICE CARD

```
. select primary
. ? #
   1
. select secondary
. ? #
   1
 . disp next 2
00001  1 Reginald is a very good wing-nut manufacturer.
00002  2 Studies poststructuralist controversy.
 . ? #
   2
 . select primary
 . ? #
   2
```

Figure 6: Parallel pointer movement in two data files

database where you want them and use the Replace command.

And remember, you can write to (make changes in) the selected database only. For example, to replace the notes in record 4 of the note file with the name of the person they refer to, type the material in figure 5.

Linking the Pointers

Earlier I mentioned that commands that affect the current database-pointer position affect only the selected database.

The Set Linkage On command, which causes the pointers for both databases to move in tandem, can help you skirt this problem. You can use any command that allows you to specify a scope (see the dBASE II manual) in this way.

Why would you use this feature? Have you ever run out of fields when creating a database? (dBASE II allows only 32 per file.) Well, with a little work, you can link two databases, forming what (almost) acts like one database with 64 fields.

Just to observe some parallel pointer movement, try the examples in figure 6. (Remember, the ?# query displays the current record number.)

One application of this command is the calculation of sums from fields in two different databases. For example, see figure 7, which contains two databases of identical structure from which we can derive sums for the first four records.

This example may seem a bit obtuse, but here's what happened: dBASE calculated two independent sums using two databases and stored the answers in two separate mem-

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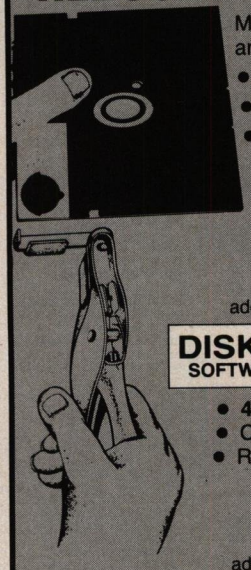

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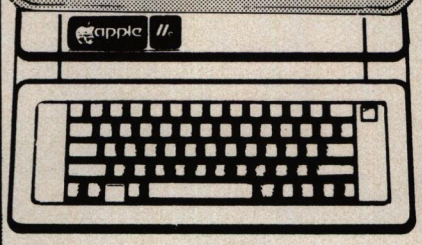

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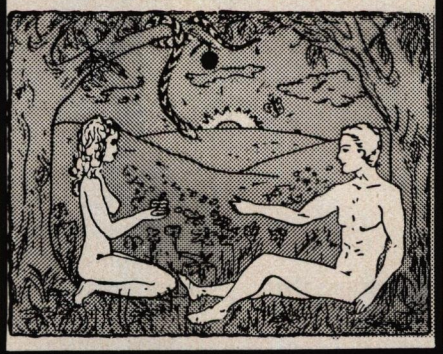

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```
FLD                    NAME                TYPE              WIDTH       DEC
001                PART:NUMB                 N                 005
002                CATEGORY                  C                 010
003                BRAND                     C                 010
004                MODEL                     C                 006
005                QUANTITY                  N                 002
006                COST                      N                 006         002
007                PRICE                     N                 006         002

 . use inv-1
 . list
00001        1 RECEIVER   NIZO        T-33          5          225.49       350.49
00002        2 RECEIVER   NIZO        T-35          4          312.00       425.25
00003        3 RECEIVER   ACME        R25-MT       13           19.99        49.99
00004        4 RECEIVER   NADIR       2-CHP        50           12.95        29.99
 . select secondary
 . use inv-2
 . list
00001       656       snowshoes   Sno Ball    zl-5        49          25.00       39.95
00002      8889       goggles     Jennings                26          10.00       15.99
00003       199       snorkels    Schearshs   SNK-4       48          16.54       25.50
00004       777       flippers    Web         flp         67          20.00       32.95

 . set linkage on
```

Note: We have to "rewind" both databases to the top.

```
 . 1 ← note: this is short for "goto 1"
 . select primary
 . 1
 . sum next 4 s.price,p.price to x,y
114.39 855.72

 . disp memory

X          (N)  114.39
Y          (N)  855.72
```

Figure 7: Deriving sums of records with the Set Linkage On command

ory variables. You could have eliminated the to x,y phrase if the screen reporting below the command line had sufficed. You could also have accomplished this summing with twice

The Goto command doesn't move both pointers, nor do the Skip or Find commands. Thus, you have to be a little crafty with your keyboard commands or programs when you use linked databases.

as many steps with Set Linkage off. Incidentally, mathematical calculations invoving secondary and primary fields are possible, too:

```
. ? s.cost +p.cost
  32.95
```

The Set Linkage On command has a few limitations that are worth noting. If one file's pointer is on the last record, pointer movement in the second file will be affected. For example, the List command may erroneously result in the display of only one record. You will have to make both pointers backtrack to the top of file somehow before listing. Also, the Goto command doesn't move both pointers, nor do the Skip or Find commands. Thus, you have to be a little crafty with your keyboard commands or programs when you use linked databases. Say you wanted to find a person and then look at fields in both databases. You'd have to use a series of commands similar to this:

```
. find ''JIM''
. display
. store # to x
. select secondary
. goto x
. display
```

You won't have many occasions to use linkage, but it's good to know about and just may get you out of a pinch sometime. Primary and secondary file areas, on the other hand, come up quite a bit—so much so that Ashton-Tate is promising tertiary and quaternary file areas in some future releases of dBASE II.

Well, until next time—keep on experimenting! ✚

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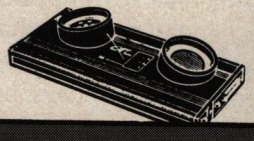

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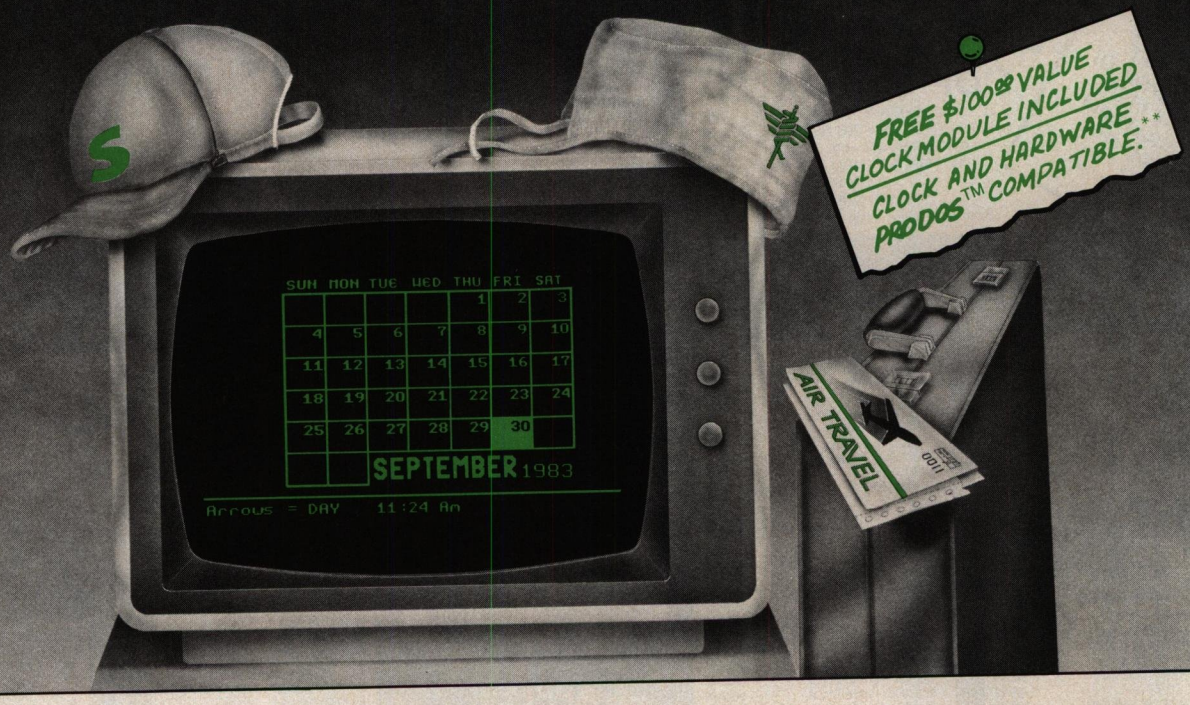

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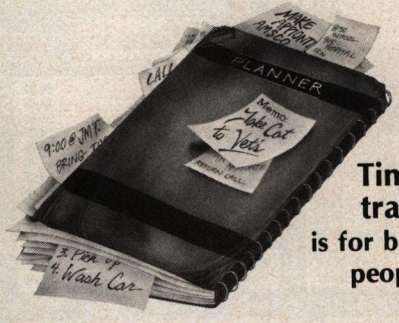

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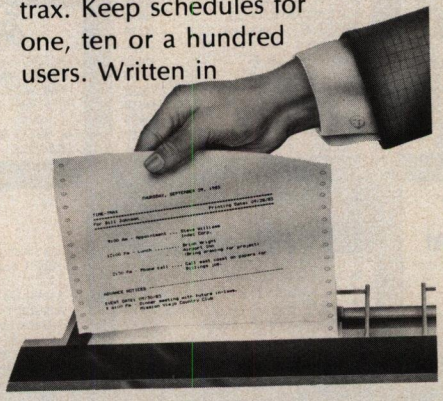

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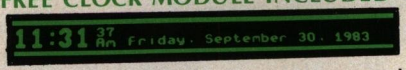

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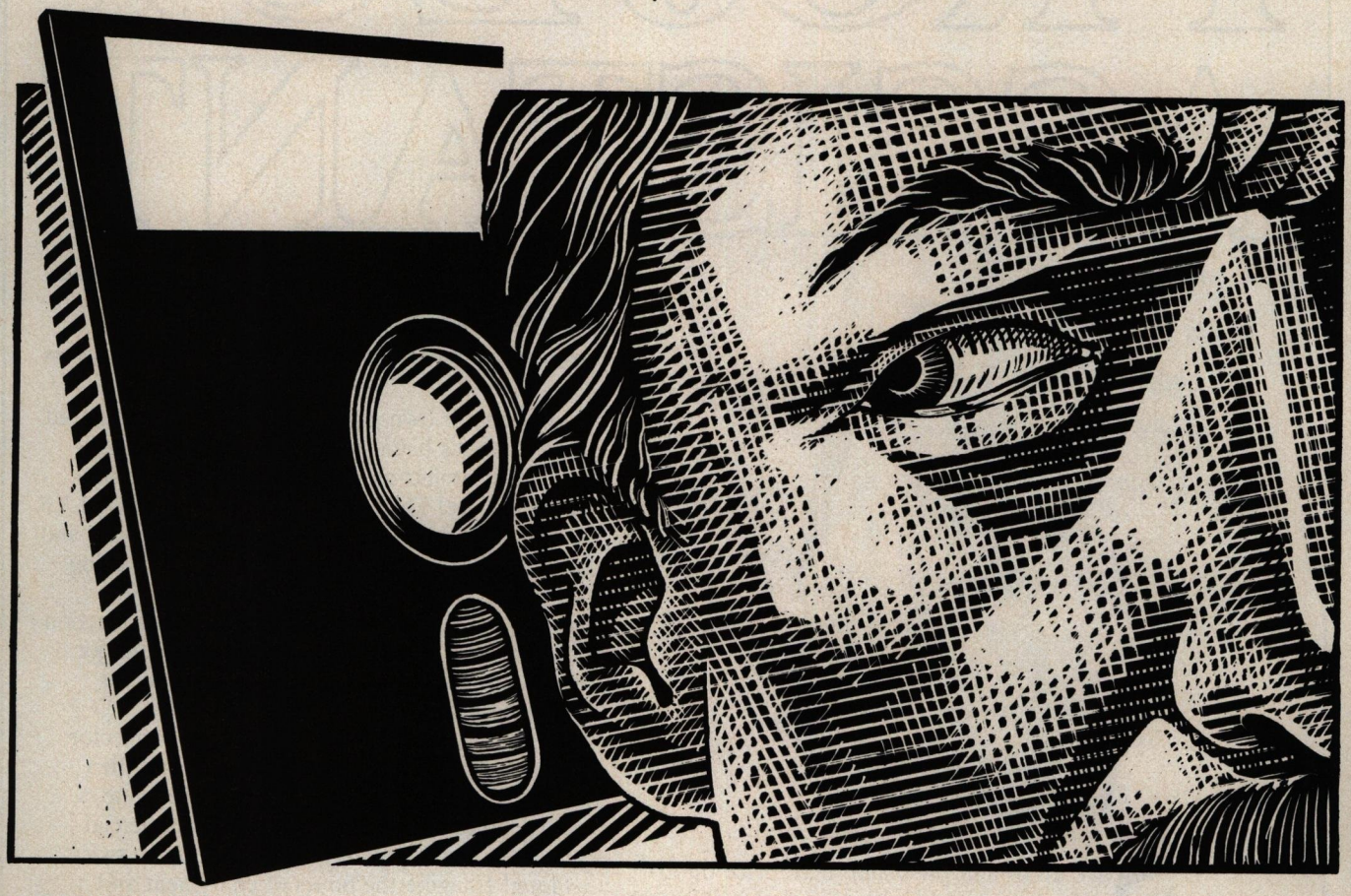
CIRCLE 111 ON READER SERVICE CARD

NEWS+
BY FREDERIC E. DAVIS

Your inside source for developments and trends in the personal-computer industry



PIRATES BEWARE!

Software companies are stepping up their efforts to take software pirates to court. Lotus Development Corporation recently settled a $10 million lawsuit against Rixon Corporation over copyright infringements on Lotus' best-selling 1-2-3 program. Lotus alleged that Rixon was making unauthorized copies of 1-2-3 for Rixon's own internal use. Although Rixon continues to deny any wrongdoing, the company has promised to return all unauthorized copies to Lotus, not to engage in any future unauthorized copying of 1-2-3, and to pay Lotus an undisclosed amount of money.

Lotus has also sent out warning letters to other corporate users of 1-2-3 whom Lotus suspects of making unauthorized copies.

Rumor has it that Brøderbund Software of San Rafael, California, has hired a private investigator to attend users' group meetings and gather evidence for possible lawsuits. Brøderbund spokesperson Cathy Carlston would neither confirm nor deny the rumor, but she did say that Brøderbund had used private eyes in the past to locate software pirates.

INK-JET PRINTERS ABOUND

Many large peripheral manufacturers are introducing ink-jet printers that are quieter than traditional dot-matrix printers and produce a higher print quality. Already in the arena—with printers targeted for Apple users—are Epson, Hewlett-Packard, Olivetti, and Quadram.

IIc OR NOT IIc?

The debate rages on about the marketing merits of the Apple IIc vs. the IIe. Because it lacks expansion slots, the IIc will never really take off—according to some Apple IIe owners. Similarly, some retailers are pushing the IIe in the belief that the system's expandability will lead to bigger aftermarket sales of add-on boards and peripherals.

Many other retailers, however, like the new IIc because they think it is easier for their salespeople to sell than the IIe. Customers have a smoother time hooking the IIc up and getting it running once they've taken it home, which reduces time-consuming calls for help to the salespeople. These retailers cite the bright packaging, increased tutorial software, and Apple's national advertising for the IIc as additional factors that make the IIc an easier sale than the IIe.

HOT MARKET FOR USED IIs

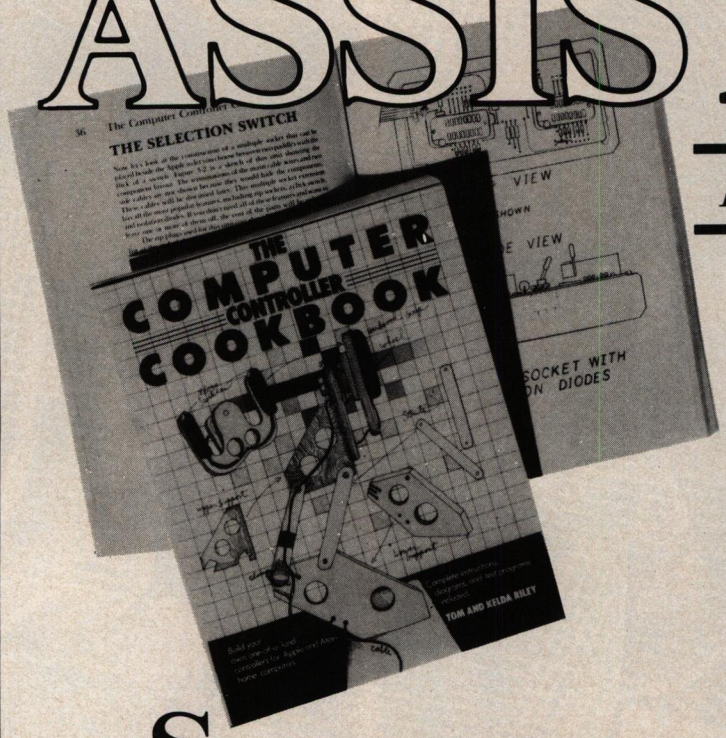
Sales are booming for used Apple II computers, according to Mark Couch, cofounder of Interstate Computer Bank

CRISTINE MORTENSEN

THE DO-IT-YOURSELFERS'

PROJECT ASSISTANT

BY TOM & KELDA RILEY



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of Mountain View, California (one of the largest dealers of used computer equipment). Couch's firm is negotiating a sale to a Fortune 500 company that already has an installed base of more than 300 Apple II systems. Couch adds that ICB offers a 90-day warranty on all of its used computers.

Even though 14 other computer stores exist within a one-mile radius of ICB, Couch says, "Retailers have been very willing to sell us their trade-ins. We work with those stores instead of competing against them." Couch says that ICB has been buying large numbers of Apple II Plus and IIe computers from retailers who are accepting the older Apple IIs from customers trading up to a Macintosh.

CAPITOL DISKETTE

Capitol Records, Inc., of Los Angeles, California, has always been a leader in storage technologies, starting at the beginning of the century with 78-RPM phonograph records. Capitol now wants a piece of the computer action and has started a new subsidiary called Capitol Data Systems. Its first product is a 5¼-inch diskette known as the Platinum Series, which the company claims can be used on all personal computers using 5¼-inch diskettes.

The Platinum Series can be used as either single-density or double-density diskettes, and they have write-protect notches and index holes on both sides for use with single-sided or double-sided drives. Capitol offers a lifetime warranty on the diskettes and hopes they will be popular with dealers who wish to stock only one type of diskette.

DISCWASHER AND THE IIc

Capitol Records isn't the only company in the record industry that's getting into computers. Discwasher of Columbia, Missouri, has come out with Cari, a combination battery pack and carrying case that turns the Apple IIc into a truly portable computer. An Apple IIc, the Apple LCD display, Cari, and accessories weigh only 21 pounds and provide three to five hours of battery operation for the computer.

UNIX FOR MAC AND LISA

Motorola, Inc., manufacturer of the 68000 microprocessor chip used in the Macintosh and the Lisa, has announced the first version of UNIX System V to be validated by AT&T. UNIX System V is the version of UNIX that AT&T is promoting as an industry standard. Motorola's product, called System V/68, is compatible with the version of UNIX that AT&T's new minicomputers in the 3B series use. This news fuels the persistent rumors that AT&T may market the Lisa and the Macintosh.

Digital Research, Inc., is also jumping on the UNIX bandwagon. Word has it that the company is working on a "rehostable" operating system for the 68000 that would allow computers to run CP/M, MS-DOS, and UNIX System V. This development would allow the Apple 32 SuperMicros to run the MS-DOS library of programs for the IBM PC, as well as CP/M and UNIX, without add-on boards or coprocessors.

CHIP CHAT

IBM is out to play hardball with other microcomputer manufacturers by trying to buy up all existing supplies of critically needed microchips. According to one of Apple's top engineers, the game works as follows. Apple pays $4 each for 64K RAM chips in quantities of 50,000. IBM goes to the same suppliers and offers $5 each for 100,000 chips, or $6 each for 200,000 chips! Clearly, IBM is making chip manufacturers an offer they can't refuse. ✚

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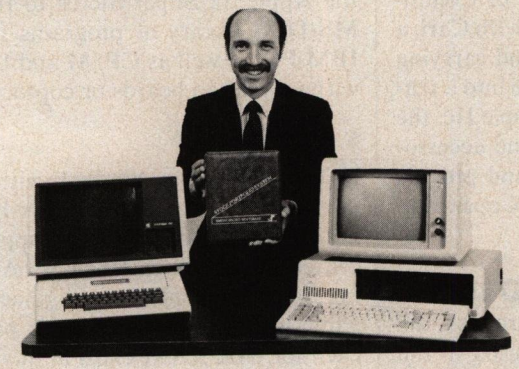

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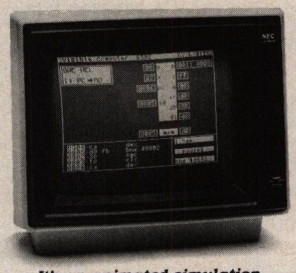
You don't need to be a genius to learn machine language.

• • • •

Just smart enough to get The Visible Computer: 6502.

Since its introduction 18 months ago, The Visible Computer: 6502 has become *the* way to tackle machine language.

From the press came rave reviews. *Incider:* "TVC is excellent." *Learning Computing* named it one of the best programs of 1983. *Peelings* magazine said: "The explanations are truly excellent, being that rare combination: correct and intelligible."



It's an animated simulation of the 6502 micro processor that lets you see with your own eyes how the 6502 works.

Basic programmers everywhere are discovering that the only mystery about machine language is why no one ever taught it this way before.

Now, better than ever. For a limited time, get a free copy of the ASSYST Editor-Assembler with every purchase of TVC: 6502. For less than the price of most assemblers alone, TVC teaches you machine language — *and* gives you the tools you need to write programs.

It's a tutorial. The 200 page manual is more than just instructions on running the simulator — it may just be the best book on machine language ever written.

It's 30 demonstration programs you'll work through with the 6502 simulator.

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For Apple II Plus and IIe. $49.95 from your dealer or direct from Software Masters, 3330 Hillcroft, Suite BB, Houston, Texas, 77057. (713) 266-5771. Bank cards accepted. Mail orders please enclose $3.00 shipping.

CIRCLE 201 ON READER SERVICE CARD

PRODUCT NEWS

HARDWARE

Microsci Floppy Disk Drives
Microsci's XL and XL80 disk subsystems are Apple-compatible floppy-disk drives. The XL has 164K capacity on 40 tracks, and the XL80 has 328K capacity on 80 tracks. Both drives have access times of 18 milliseconds and use a horizontal-clutch carrier plate that makes their size and shape noticeably different from those of typical drives. *(List Price: XL, $199; XL80, $299)*
Requires: Apple II, II Plus, or IIe
Microsci
2158 South Hathaway Street
Santa Ana, CA 92705
(714) 241-5600
CIRCLE 700 ON READER SERVICE CARD

Distar Apple Drive
Distar Apple Drive is a 5¾-inch slimline floppy-disk drive with automatic DOS selection. It uses direct-drive spindle motors and has an in-use zero-track sensor and a positive disk-lock lever. The drive has a storage capacity of 160K per drive on 40 tracks and an access time of 18 milliseconds. It comes complete with cabinet and cable. *(List Price: $169)*
Requires: Apple II or IIe
Burke and Associates
1720 Los Angeles Avenue, #221
Simi Valley, CA 93063
(805) 584-3220
CIRCLE 701 ON READER SERVICE CARD

TeleTypesetting Interfaces
TeleTypesetting Company has introduced a series of interfaces for microcomputers and phototypesetting equipment. The interfaces allow typesetters to use microcomputers as text-entry stations so that you do not need to retype and reproof text stored on a microcomputer disk. Once you have recorded text on disk, you can transfer it directly to a phototypesetting machine. *(List Price: $995)*
Requires: Apple II, II Plus, IIe, or III in Emulation mode
TeleTypesetting Company
224 Nickels Arcade
Ann Arbor, MI 48104
(313) 761-7664
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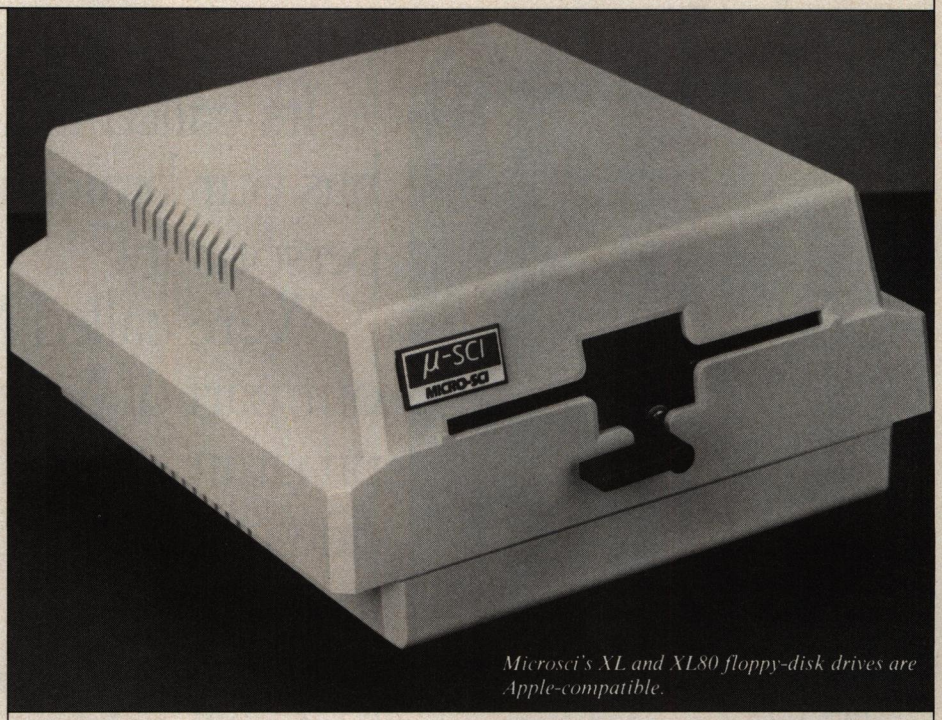

Microsci's XL and XL80 floppy-disk drives are Apple-compatible.

R212A Intelligent Modem
The R212A Intelligent Modem is available as a compact stand-alone unit or as a card and works with computers that have an RS-232C interface. It features an integral automatic dialer and operates full-duplex asynchronously at speeds up to 300 bps or character asynchronously at 1200 bps over ordinary telephone lines. The modem plugs into a standard electrical outlet but is battery protected to prevent loss of data in case of power failure. You can control all commands and options from your Apple keyboard. *(List Price: $499)*
Requires: Apple II, II Plus, or IIe
Rixon, Inc.
2120 Industrial Parkway
Silver Spring, MD 20904
(301) 622-2121
CIRCLE 703 ON READER SERVICE CARD

HARDWARE ACCESSORIES

Disk-O-Tel
Disk-O-Tel, a diskette-storage unit, is available in two versions—the Model DT (desktop), which is mounted on a ball-bearing turntable, and the Model HR (high rise), which is mounted on a swivel arm 8 inches above the desktop. Both units measure 14 inches in diameter, are 6 inches high, contain 108 dustproof numbered diskette compartments, and come with a diskette index. *(List Price: Disk-O-Tel DT, $49.95; Disk-O-Tel HR, $59.95)*
Close Enterprises
P.O. Box 13903
Department 41
Arlington, TX 76013
(817) 429-9006
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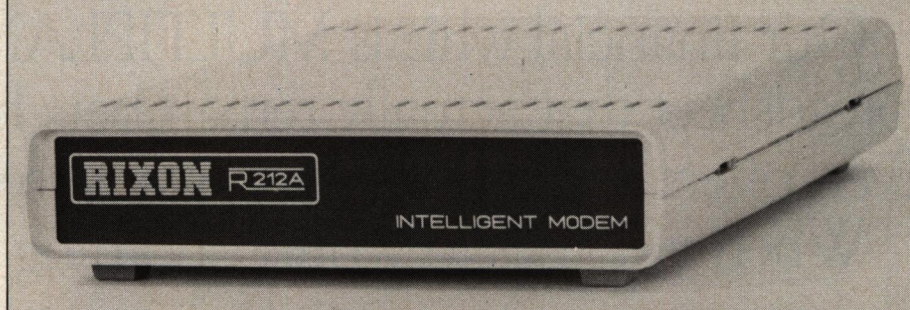
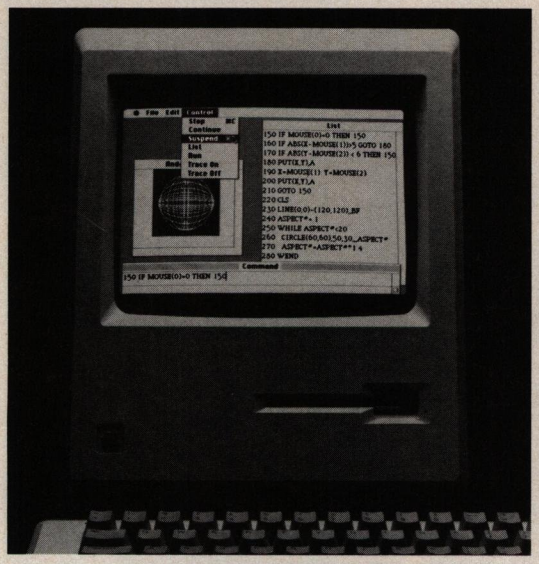


The Rixon R212A Intelligent Modem can store up to ten phone numbers of 60 characters each.

Apple's® new baby has



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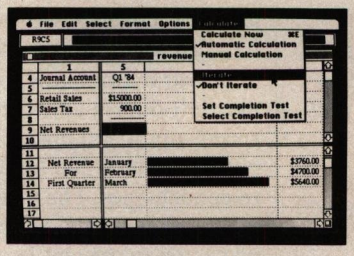

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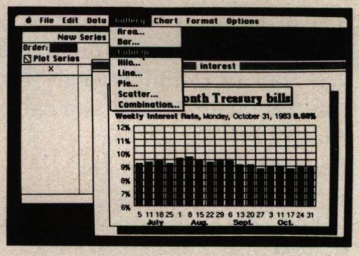

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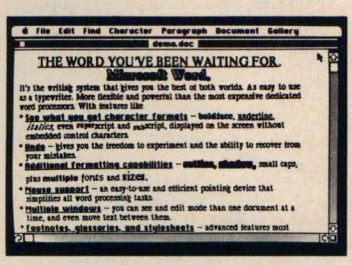
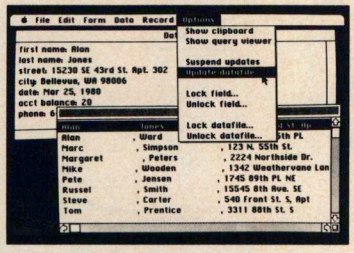


Microsoft Word



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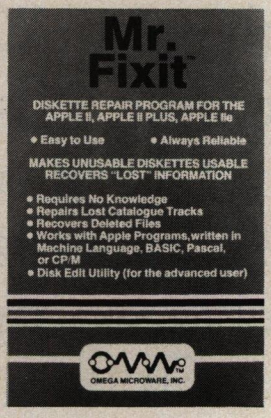
Sooner or later, you're going to have a valuable word processing, spread sheet or data base disk go bad on you. And no matter whether it's due to physical damage or unexplained failure, hours or even days of work will go down the drain. Unless you have Mr. Fixit—the new, state-of-the-art data retrieval program from Omega MicroWare.

As long as your problem disk is unprotected and will spin in its drive, Mr. Fixit will scan it and tell you which tracks and sectors are readable and exactly how much information you can expect to recover. Then it will let you copy all recoverable information...and with Mr. Fixit almost everything is...onto a new disk.



If you've accidentally deleted information, Mr. Fixit can recover it for you, as long as you haven't written over it. If you've lost your disk catalog, Mr. Fixit can restore that, too. For more sophisticated users, Mr. Fixit can also edit selected disk sectors and perform DOS "hot patches" and disassembler functions.

So, if you're an Apple or IBM-PC computer user with a lot of valuable data disks on file, don't risk losing them a day longer. Get Mr. Fixit and fix blown disk problems for good!

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CIRCLE 149 ON READER SERVICE CARD

PRODUCT NEWS

Entry Rest, from Discwasher

Entry Rest
Entry Rest is designed to ease the arm, wrist, and shoulder fatigue that results from extended periods of work with a computer. The rest is made of solid oak and includes a built-in multifunction calculator with memory and a static grounding bar that protects the computer from static charges. *(List Price: $34.95)*
Requires: Apple II, II Plus, or IIe
Discwasher
1407 North Providence Road
Columbia, MO 65205
(314) 449-0941
CIRCLE 705 ON READER SERVICE CARD

SOFTWARE

PractiCalc II
Apple users can now use PractiCalc, a powerful, professional spreadsheet program. This version has all the features of the original program—such as alpha and numeric sorting and search, prompts for entry during calculation, and printing list formulas—along with 15 new features. These new features include advanced editing abilities, variable column width in all columns, uppercase and lowercase entry and printing, the ability to make long labels, automatic and manual recalculation, and an on-screen default menu. *(List Price: $69.95)*
Requires: Apple II, II Plus, or IIe; 48K RAM; one disk drive
Micro Software International
The Silk Mill
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(617) 965-9870
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ProfitTaker, Version 2.0
ProfitTaker futures-trading software makes a wide range of reports available for traders to analyze, supplies them with trading recommendations, and can calculate a broad spectrum of technical indicators. Version 2.0 of the program also automatically updates commodity prices through the use of Commodity Systems, Inc., data service. A supplement to ProfitTaker, the ProfitAnalyst history-tester module allows traders to analyze the profitability of their trading plans on a commodity-specific basis.

Beat It!

Turn your Apple II®, II+® or IIe® into a drum and percussion instrument with **Drum-Key®**, an interface board/software package that lets you create music using digital recordings of actual percussion sounds. It's like having 28 different percussion instruments at your fingertips. You can compose, play, record and playback, even use pre-recorded rhythm patterns of all the percussion sounds. Use these patterns or create your own to provide a background for singing or playing other instruments. **Drum-Key** is suitable for the serious musician or the novice — or for just having fun. And it's an excellent way to learn rhythm.

A **Drum-Key** package in your Apple, connected to your stereo provides full programmability and storage capacity for 100 rhythm patterns and 26 songs. A scrolling Hi-Res graphic screen displays instrument staves for easy learning, quick notation and editing.

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SPEED UP YOUR APPLE

Here's a whole new way to polish up your Apple II™ or Apple III™. RAMDISK 320™ from Axlon.

Thousands of users are discovering right now how RAMDISK 320™ can boost both memory and access speeds of their Apples. The ultrafast RAMDISK is up to 50 times faster than standard floppydrives, and 10 times faster than hard disk drives. You can easily sort two full disks in 15 seconds. Besides faster, error-free throughput, RAMDISK 320™ is designed to save wear and tear on your floppy drives. There are no moving parts. RAMDISK 320™ has its own power supply, plus three-hour battery backup. RAMDISK 320™ draws no power from your Apple, and it retains data even when turned off. Your RAMDISK 320™ solid-state memory add-on system is fully compatible with Apple DOS 3.3, SOS, CP/M™, Apple Pascal 1.1 and Pascal 4.0. (In fact, we'll give you these free with each RAMDISK 320™.) RAMDISK 320™ comes with a plug-in, slot-independent interface card. And it includes a specially designed operating program, plus software for diagnostics, and fast-load copy routines.

RAMDISK 320™ can help you zoom through a wide variety of tasks in the real world – word processing, accounting, data base management, software development, educational and scientific data processing, or whenever speed is of the essence.

Supercharge your Apple to go 50 times faster.

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CP/M is a trademark of Digital Research

Price: $995.
Limited one-year warranty.

RAMDISK 320™

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(408) 747-1900.

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1287 Lawrence Station Rd.
Sunnyvale, CA 94089

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PRODUCT NEWS

(List Price: ProfitTaker, $795 [floppy disk], $895 [hard disk]; ProfitTaker with ProfitAnalyst, $1495 [floppy disk], $1795 [hard disk])
Requires: Apple II Plus or IIe; 48K RAM; one disk drive
Investment Growth Corporation
3601 Swann Avenue, Suite 205
Tampa, FL 33609
(813) 870-0659

CIRCLE 707 ON READER SERVICE CARD

Credit Bureau Access System

The Credit Bureau Access System allows you to automatically run credit checks on up to 30 names at one time using any Credit Bureau on the Trans Union System. Once you have correctly entered all the data, the system calls the Credit Bureau, gives it your three-character password, sends the search strings, and receives and prints the information. *(List Price: $295)*
Requires: Apple II, II Plus, or IIe; 64K RAM; one disk drive; 80-column printer with buffer; D.C. Hayes Micromodem II
Aurora Systems, Inc.
2423 American Lane
Madison, WI 53704
(608) 249-5875

CIRCLE 708 ON READER SERVICE CARD

MegaFinder

MegaFinder, a powerful data-management program, comes complete with a report generator and includes a selection of ready-made forms and reports that provide solutions for home, business, and personal finance.

MegaFinder allows you to design forms from scratch, as well as change existing forms, with its easy-to-use screen editor. The program's report generator allows you to store report formats. MegaFinder is compatible with other Megahaus programs, such as MegaWriter (a word processor with MailMerge) and MegaSpell (a spelling checker). *(List Price: $149.95)*
Requires: Apple II, II Plus, or IIe
Megahaus Corporation
5703 Oberlin Drive
San Diego, CA 92121
(619) 450-1230

CIRCLE 709 ON READER SERVICE CARD

What made over 100,000 Apple II owners fall in love with System Saver?

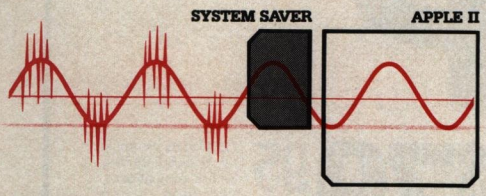
It's the most versatile, most convenient, most useful peripheral ever made for the Apple.®

System Saver® filters out damaging AC line noise and power surges.

70-90% of all microcomputer malfunctions can be traced to power line problems.* Problems your System Saver guards against.

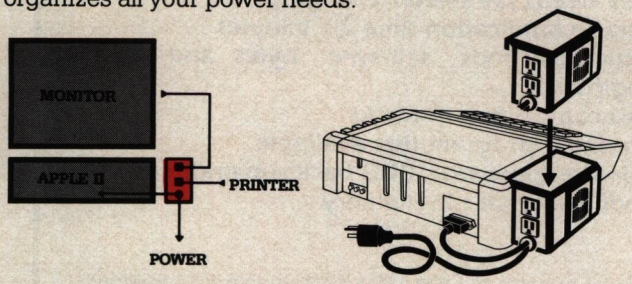
Power line noise can often be interpreted as data. This confuses your computer and produces system errors. Power surges and spikes can cause severe damage to your Apple's delicate circuitry and lead to costly servicing.

System Saver clips surges and spikes at a 130 Volts RMS/175 Volts dc level. A PI type filter attenuates common and transverse mode noise by a minimum of 30 dB from 600 kHz to 20 mHz with a maximum attenuation of 50 dB. You end up with an Apple that's more accurate, more efficient and more reliable.



System Saver makes your Apple more convenient to use.

No more reaching around to the back of your Apple to turn it on. No more fumbling for outlets and cords to plug in your monitor and printer. System Saver organizes all your power needs.

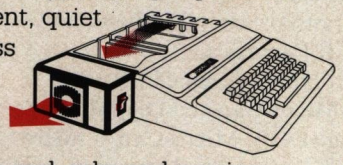


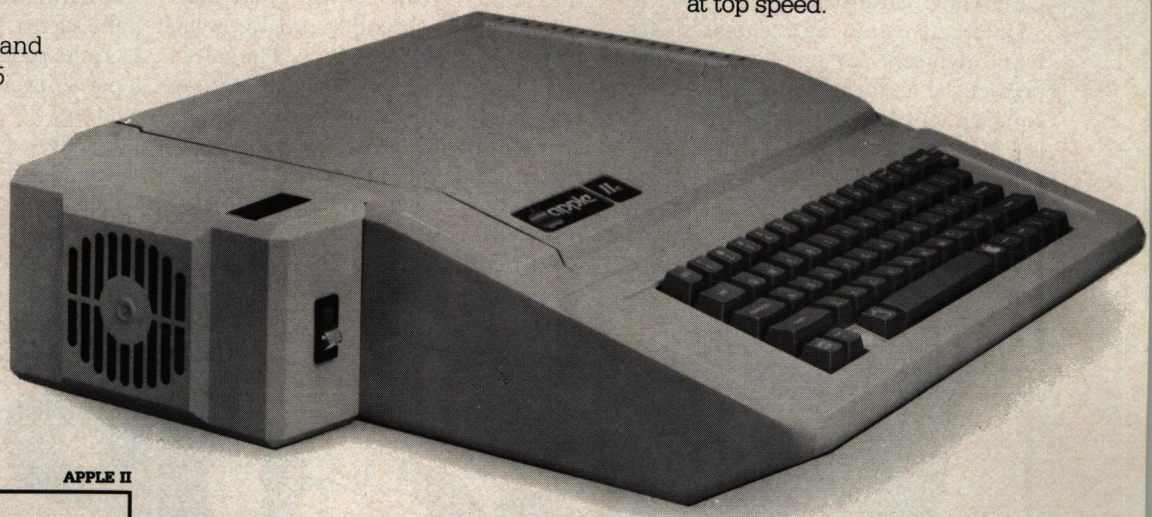
It functions as a multi-outlet power strip with two switched outlets. Plus System Saver offers the ultimate convenience; a front mounted power switch for fingertip control of your entire system.

System Saver lets your Apple keep its cool.

Today's advanced peripheral cards generate heat. In addition, the cards block any natural air flow through the Apple IIe creating high temperature conditions that shorten the life of the Apple and peripheral cards.

System Saver's efficient, quiet fan draws fresh air across the mother board, over the power supply and out the side ventilation slots. It leaves your Apple cool, calm and running at top speed.





So if you want to keep damaging heat, line noise and power surges out of your system for good, pick up the only peripheral that's in use every second your computer is in use. The System Saver. You'll soon come to think of it as the piece Apple forgot.

Compatible with Apple stand

$89.95 at Apple dealers everywhere.

KENSINGTON MICROWARE

CIRCLE 132 ON READER SERVICE CARD

251 Park Avenue South, New York, NY 10010
(212) 475-5200 Telex: 467383 KML NY

*PC Magazine: March 1983.

System Saver is UL Listed. System Saver's surge suppression circuitry conforms to IEEE specification 507 1980, Category A. Available in 220/240 Volts, 50/60 Hz.

System Saver is a registered trademark of Kensington Microware Ltd.
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PRODUCT NEWS

Dynacomp Software
New from Dynacomp, the Operations Research Tutorial contains a collection of 17 menu-selected programs that provide you with data-file creation, manipulation, and calculation abilities that support the analysis of Payoff Tables, Simplex Linear Programming, Distribution/Transportation Methods, and CPM/PERT analysis.

Two programs designed for engineers are Micro-Cap and Digital Image Processing (DIP). Micro-Cap, a microcomputer circuit-analysis program, is a design tool that provides engineers with an interactive drawing and analysis system. Engineers can quickly design and predict the performance of their circuits without having to build them. DIP is a menu-driven program that allows you to digitally manipulate images to remove interference and noise, improve contrast, and sharpen and filter images. *(List Price: Operations Research Tutorial, $99.95; Micro-Cap, $399.95; Digital Image Processing, $59.95)*

Requires: Tutorial and DIP require Apple II, II Plus, or IIe; 48K RAM; one disk drive. Micro-Cap requires Apple II, II Plus, or IIe; 64K RAM; DOS 3.3; two disk drives.
Dynacomp, Inc.
1427 Monroe Avenue
Rochester, NY 14618
(716) 442-8960; (716) 442-8731
CIRCLE 710 ON READER SERVICE CARD

Aladin
Aladin is a menu-driven, relational database-management system that you can integrate with other programs such as WordStar and VisiCalc. The software incorporates calculation, statistics, and graphics capabilities. It has easy-to-use menus, built-in Help screens, maximum file size, variable-length records, virtual memory, and other advanced features. *(List Price: $595 for Apple II; $795 for all other versions)*
Requires: Apple II—64K RAM, two disk drives; Apple III—256K RAM, hard-disk drive
A.D.I. America
1215 Howe Avenue
Sacramento, CA 95825
(916) 925-2229
CIRCLE 729 ON READER SERVICE CARD

Data Spectrum
Data Spectrum is an advanced information-management package intended for novice computer users. It contains a step-by-step programmed-learning instruction course that you can display on the screen. If you couple it with a printer, the program can print labels, reports, invoices, and personalized form letters. *(List Price: $250)*
Requires: Apple II, II Plus, IIe, or III in Emulation mode; 48K RAM; two 5¼-inch floppy-disk drives recommended.
Advanced Business Computing, Inc.
Park Ridge, IL 60068
(312) 298-0997
CIRCLE 727 ON READER SERVICE CARD

BACK UP YOUR DISKS

NOW AVAILABLE AT YOUR LOCAL COMPUTER STORE!

$79.95

EDD runs on Apple II, II plus (including most compatibles), IIe, and III (in emulation mode), with one or two 3.3 disk drives.

ESSENTIAL DATA DUPLICATOR III™

EDD is the most powerful copy program available for backing up your protected Apple software.
Since EDD has been preset to copy a broad range of copy-protections, many disks can be copied easily, without changing messy parameters. Even though you rarely need to change them, each parameter is fully described in the operating manual. Unlike the copycards, which only copy single load programs, EDD backs up entire disks. Thus, not only copying single load, but, multi disk access programs as well. We feel on an average, EDD can back up many more protected disks than all other copy programs or copycards put together.

- Automatically copies most protections.
- Rarely needs parameter changing
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- Accurately finds "self-sync" bytes and their lengths
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- Updated program lists available
- Unlike copycards, EDD backs up entire disks, not just what's in memory

To order direct; send **$79.95** plus $2 shipping ($5 foreign), California residents add 6%. Mastercard/Visa accepted. *Prepayment required.*

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FOR APPLE AND COMMODORE
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New! **Cooling Fan for APPLE II, II+ & *IIe**

• **Line surge protection** • Snaps on the side of APPLE II, II+ and *IIe** enclosures • Eliminates overheating problems, thereby boosting reliability & operation life of computer • Switch on front serves as power switch for fan, computer, and extra outlet Size: 7"L x 2⅜"W x 4¼"H • Weight: 2 lbs.

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APPLE™ Compatible 5¼" Disk Drive and Controller Card

• Uses Shugart SA390 Mechanics • 143K formatted storage • Color matches Apple Computer • Works with Apple Controller or other Apple-compatible controllers • Complete with connector – just plug into your disk controller card • 35 tracks • Size: 6"L x 3½"W x 8-9/16"D • Wt.: 4¼ lbs.

ADD-514. . (Disk Drive). . $195.95

ACC-1. . . . . (Controller Card) . . $69.95

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FOR APPLE AND COMMODORE

Add speech capability to your Apple II, II+, *IIe, Commodore 64 or VIC-20 computer with JAMECO's JE520 Series Voice Synthesizer. Speech – the most effective means of communication available to man – is now immediately available for your computer.**

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- Programs in BASIC and/or assembler.
- Very understandable & realistic male voice.
- Built-in amplifier, speaker, volume control and audio jack.
- Plug-in user-ready with complete documentation & sample software.

JE520CM JE520AP

The JE520 will plug right into your computer and be talking in minutes. It produces a very clear, natural male voice. The outstanding speech quality is produced using National Semiconductor's Digitalker™ speech processor IC with 4 custom memory chips.

Case Size: 7¼"Lx3¼"Wx1⅜"H

JE520CM For Commodore $114.95
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CDB25P-4-P	J	4'	$13.95
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CDB25P-4-S	L	4'	13.29
CDB25P-10-S	L	10'	15.49

"Centronics" Type

Part No.	Style	Length	Price
CEN36M-5-M	J	5'	$19.95
CEN36M-15-M	J	15'	26.95
CEN36M-5-F	L	5'	22.95
CEN36M-15-F	L	15'	28.95

IBM PC Parallel Printer Adapter Type
(CDB25 Male to Centronics Male)

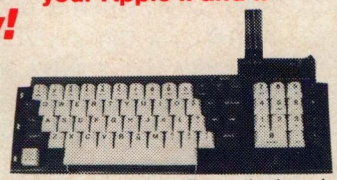
Part No.	Length	Price
CDB25P-5-CEN36M	5'	$17.95
CDB25P-15-CEN36M	15'	22.95

Style J Male to Male
Style L Male to Female

We stock over 200 different cables. If you don't see what you need, please call.

Keyboard with Numeric Keypad for your Apple II and II+*

New!



• Plugs directly into Apple II or II+ motherboard with 16-pin ribbon cable connector • 26 special functions • Size: 14"L x 5½"W x 1½"H • Color (keycaps): white/grey • Weight: 2 lbs.

KB-A68. . . . . $99.95

80-Column plus 64K RAM for your APPLE *IIe*

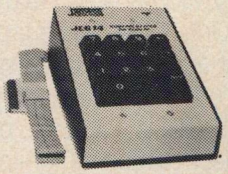
Now you can double the memory capacity and get an 80-column display format for your APPLE *IIe* computer at an affordable price. Just plug the JE864 card into your APPLE* and expand your display to 80 characters per line. Perfect for word processing. The JE864 also features 64K bytes of additional memory to allow programming not possible with standard APPLE *IIe* computers. Complete documentation included.

Board: High density board design squeezes 64K bytes of RAM onto a 2½" x 4½" board • Fully tested to assure proper operation.

Uses: Word processing – displays 1000 more characters per screen • Extra memory allows running of extremely large programs • Ultra High Resolution Graphics capability.

JE864. . . $124.95 ~~$149.95~~

Numeric/Auxiliary Keypad for your APPLE *IIe*



The JE614 is a newly introduced numeric/auxiliary keypad for the APPLE *IIe.** It offers the flexibility of a 10-key pad and the convenience of 23 directly accessible functions. Screen manipulating functions make word processing a snap and cursor controls make the keypad ideal for VisiCalc** users. The JE614 Keypad is housed in a durable metal enclosure and is color-coordinated with your APPLE *IIe* computer. Operation of the keypad can begin within minutes from unpacking. Special functions include: Home, Clear, Clear to End of Screen, Scroll-Up, Scroll-Down, Tab, Delete, Left, Right, Up and Down. Each key has auto-repeat. Size: 5⅞" L x 4-3/16" W x 1¼" to 2½" Slope.

JE614 . . . . . $89.95

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**VisiCalc is a registered trademark of Visi Corp. Inc.

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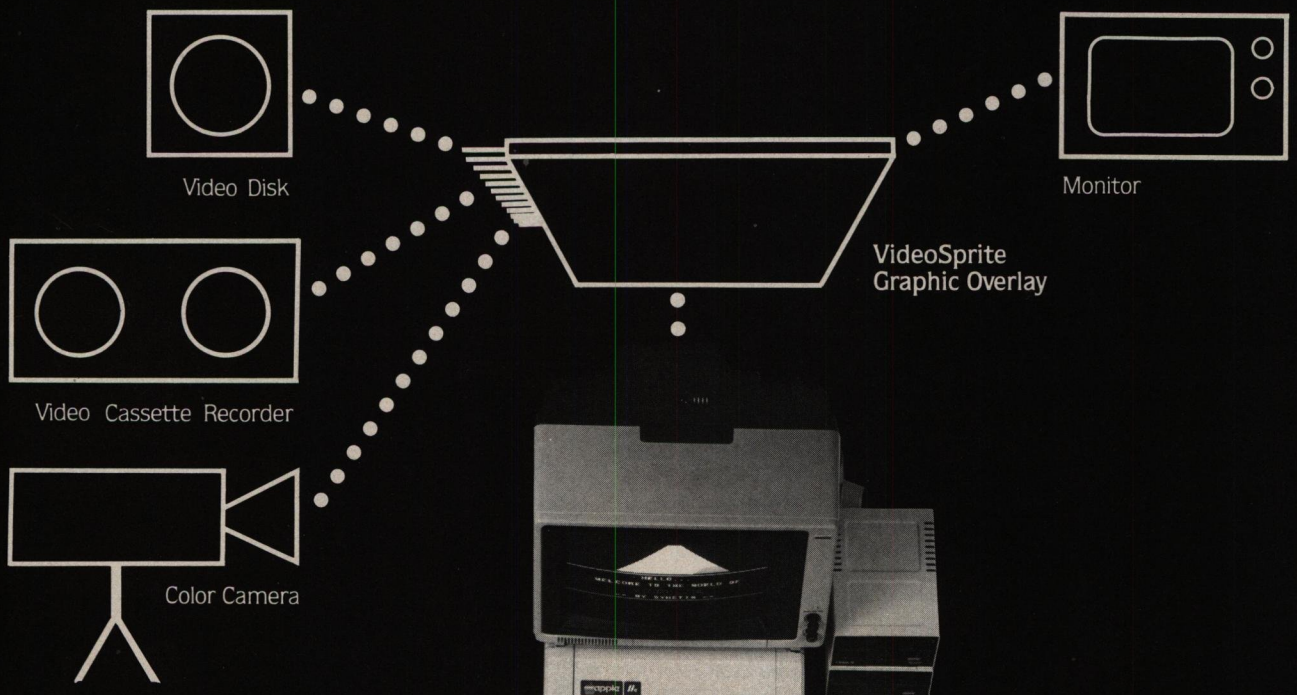
Interactive Video that you never dreamed possible!



VideoSprite™ from Synetix is a plug-in expansion board to the Apple II® that overlays computer generated animation, graphics and text on any incoming video signal for simultaneous display. An exciting and powerful tool for developers of interactive video, VideoSprite is both very affordable and extremely flexible.

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VideoSprite is only $995 with all necessary software utilities which include a paint program and a font editor. VideoSprite for the IBM PC® will soon be offered.* Visit your local video dealer or call us direct to place your order.

800-426-7412

Synetix Inc.

10635 NE 38th Pl., Kirkland, WA 98033 (206) 828-4884

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IBM PC is a registered trademark of International Business Machines Corporation.

CIRCLE 138 ON READER SERVICE CARD

*IBM version, June 15 anticipated delivery date.

Stoneware, Inc's DB Master Version Four

DB Master Version Four
DB Master Version Four, a business data-management system, now includes a file converter—a program that lets you transfer existing PFS:File and Visi-File files into the greater capacity files of DB Master without making you re-type the form or its data. The file converter also lets you combine two or more files of the same format into a single large DB Master file. *(List Price: $350)*
Requires: Apple II Plus or IIe
Stoneware, Inc.
50 Belvedere Street
San Rafael, CA 94901
(415) 454-6500
CIRCLE 712 ON READER SERVICE CARD

Superex Business Software
Thirteen new programs from Superex Business Software provide a host of services for many different businesses. Accountant includes a cash module that maintains ten separate bank accounts plus modules for accounts receivable, accounts payable, general ledger, and payroll. *(List Price: $300)*

Wholesaler, designed to run the operations of any wholesale business, has a capacity of up to 20,000 inventory items and 10,000 accounts-receivable customers, on hard disk, and 2500 or more inventory items and 1000 accounts-receivable customers, on floppy disk. *(List Price: $600)*

Financial Analyst can evaluate securities, loans, mortgages, bonds, certificates of deposit, discount securities, and sinking funds. It also generates financial information on money-market securities. *(List Price: $300)*

Mail Order House handles order entry, inventory control, billing, and accounts receivable. *(List Price: $600)*

Retailer's features include issuing sales receipts, automatic inventory updating, tracking back orders, generating invoices, and tracking receivables. *(List Price: floppy disk, $300; hard disk, $450)*

Personnel Agency can maintain a database of up to 900 files of job seekers and 900 job offers; the program matches jobs to job seekers, using 150 specifi-

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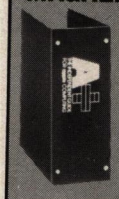

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Address_____
City/State/Zip_____
*Residents of PA add 6% sales tax.

cations. (*List Price: $450; optional billing function, $150*)

Pharmacist's Assistant, designed to run any small- or medium-sized pharmacy, can handle 16,000 prescriptions, 6000 inventory items, 1000 customers, 1000 doctors, and up to ten preprogrammed special-billing plans. This program will be updated with an optional biweekly disk to keep up with rapid price changes. (*List Price: $2000; demo disk with documentation, $30*)

Importer-Exporter has an inventory capacity of 20,000 items on hard disk and 2500 on floppy disk. The program keeps track of ten currencies, restructuring price schedules as changes occur. (*List Price: $600*)

Service Center performs order entry, inventory control, labor billing, invoicing, and accounts receivable. (*List Price: $500*)

Retailer With Rental can automate rental operations with products as diverse as videotapes, tuxedos, and heavy equipment; the program updates mailing lists, tracks for overdue items and back orders, and generates reports on sales and rentals. (*List Price: $600*)

Real Estate Broker matches client preference and financial status with a suitable property, calculates financial options available, and maintains a database of all former customers. (*List Price: $450; billing option, $150*)

Dentist can maintain a 10,000 patient database, compile medical background for each patient, and present—through a graphics module—a patient's dental makeup. (*List Price: single-provider practice, $1200; multiple-provider practice, $1800*)

Requires: Apple II, II Plus, IIe, or III in Emulation mode; 64K RAM; two disk drives or hard-disk drive

Superex Business Software
P.O. Box 248
151 Ludlow Street
Yonkers, NY 10705
(800) 862-8800
(914) 964-5200

CIRCLE 713 ON READER SERVICE CARD

Documax

Documax is a fast, easy-to-use document-handling system designed for those who manage word processing, electronic mail, and other files of textual information. A totally menu-driven program, Documax is an electronic file cabinet that combines functions of accessing, storing, and organizing documents. The program contains a proprietary text-compression scheme that doubles the capacity of any disk. You can restore compressed files to original form using the program's Recover function. Documax can also manage information generated by word processors or acquired by modem from electronic mail or information databases. (*List Price: $175*)

Requires: Apple II, II Plus, IIe, or III in Emulation mode; 48K RAM

Signum Microsystems, Inc.
120 Mountain Avenue
Bloomfield, CT 06002
(203) 726-1911

CIRCLE 714 ON READER SERVICE CARD

After games, spreadsheets and word processing...

+MEDCLAIMS

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If your family medical/dental claims have you overwhelmed and underpaid, MEDCLAIMS will help.

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Chalk Board™ wants your opinion.

Chalk Board wants you to help direct the company's future. We are beginning a new user input program. If you would like to become part of this innovative new concept, start by filling out the questionaire below.

1. **Are you aware of and familiar with the new peripheral, the Chalk Board PowerPad™ touch-tablet?**
   Yes ☐ No ☐ (You can find out more at your local computer store)

2. **There are many unique features that are offered only on the Chalk Board PowerPad. We would like to know which is the most important to you. (Please rank 1-5)**
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   - ☐ Programmable surface
   - ☐ Graphics/Music/Game Design/Versatility

3. **Which of the following uses of the Chalk Board PowerPad that have already been discovered do you think are most important? (Please rank 1-6)**
   - ☐ Graphics
   - ☐ Music composition
   - ☐ Game design
   - ☐ Special effects
   - ☐ Programming
   - ☐ Learning through discovery

4. **Which of the following uses of the Chalk Board PowerPad currently under development do you consider the most important? (Please rank 1-5)**
   - ☐ Free-form game play
   - ☐ Test preparation (SAT, ACT, etc.)
   - ☐ Custom video design
   - ☐ Laser disk control
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5. **What other uses can you imagine for the Chalk Board PowerPad.**

   A. _____

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Users can define their own category labels under which data can be grouped for ease of scheduling, searching, and printing. You can search for an entry by using any set of characters within that entry. Time-Trax prints in a convenient list form for any day(s) in the past, present, or future. *(List Price: $99.95)*
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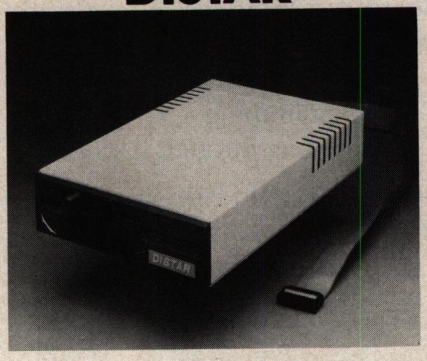

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Transitions
Transitions lets you create professional-looking slide-show presentations that can be self-running or operated manually. You can combine pictures using up to 44 different "transitions" or screen wipes between them, and you can see miniature versions of the images displayed on the screen. The program works with pictures saved either in packed or standard Apple format and includes a picture-packing program. *(List Price: $49.95)*
Requires: Apple II, II Plus, or IIe; 48K RAM (36 transitions) or 64K RAM (44 transitions)
Penguin Software
830 4th Avenue
P.O. Box 311
Geneva, IL 60134
(312) 232-1984
CIRCLE 717 ON READER SERVICE CARD

The Print Shop
The Print Shop enables you to write, design, and print your own greeting cards, stationery, letterheads, signs, and banners. This menu-driven program has a built-in graphics editor, so that you can create your own pictures and symbols or modify those provided, and it also has text-editing features. Other program options include eight different typefaces; solid, outline, and 3-D formats; nine border designs; ten abstract patterns; and twelve kaleidoscopic animations. *(List Price: $49.95; paper refills, $14.95)*
Requires: Apple II, II Plus, or IIe; 48K RAM; printer
Brøderbund Software
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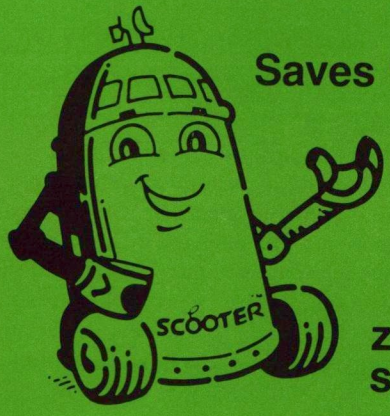
(415) 479-1170
CIRCLE 718 ON READER SERVICE CARD

SCOOTER

Ø-FORCE TWIN PORT



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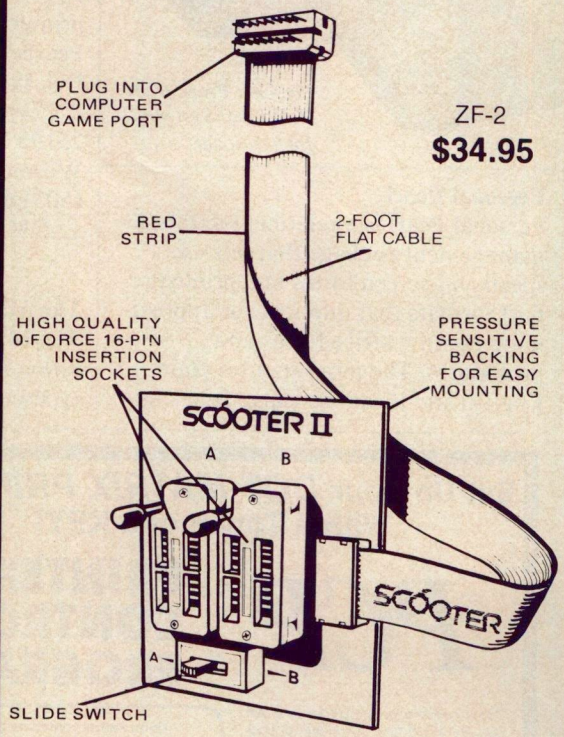

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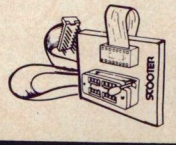

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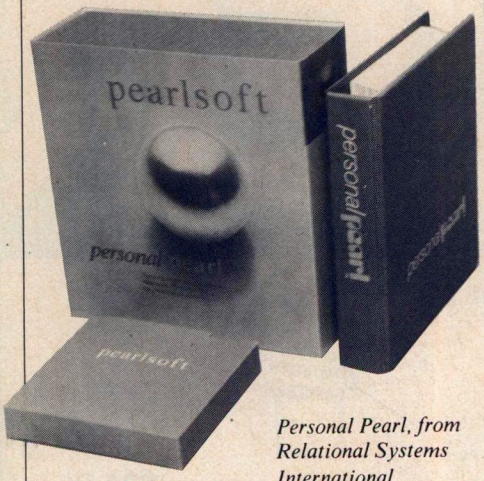

Personal Pearl, from Relational Systems International

Personal Pearl
Personal Pearl is a relational-database-management package that lets users specify on-screen forms and printed report formats that duplicate or approximate existing office forms and procedures. The program uses plain English and is easy to learn. It has its own report generator and sorting and file-maintenance utilities built in and includes several useful application programs, including a cash-disbursements journal, appointment calendar, and people-information file. Personal Pearl can also link with SuperCalc for spreadsheet calculations and WordStar for preparing coordinated reports. *(List Price: $295)*
Requires: Apple II, II Plus, or IIe; 64K RAM; CP/M 2.2 card; two disk drives; printer optional
Pearlsoft Division
Relational Systems International Corporation
25195 Southwest Parkway
Wilsonville, OR 97070
(503) 682-3636
CIRCLE 719 ON READER SERVICE CARD

The Micro/Typographer
The Micro/Typographer is a high-resolution lettering system that works like a typesetter to label new or existing graphic images. The package includes the Screen Composer, which enables you to rotate, color, and space type. It also includes Vectorplot, a fast, easy-to-use font developer that has many editing features. *(List Price: $29.95)*
Requires: Apple II or IIe; 48K RAM; DOS 3.3
Tid Bit Software
P.O. Box 5579
Santa Barbara, CA 93108
(805) 969-5834
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Astro-Aid, an integrated software package for astronomical work, provides 44 menu-selectable astronomical functions. The package includes a 40-page manual explaining its use and the astronomical theory involved. It is suitable for use by professionals, amateurs, or anyone who wants to learn about astronomy and the sky. *(List Price: $29.95)*

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N DOUBLEWIDE EMPHASIZED
O DOUBLEWIDE EMPHASIZED DOUBLESTRIKE
P CONDENSED DOUBLEWIDE
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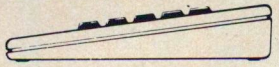

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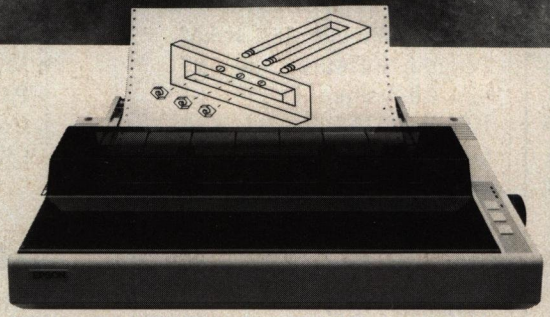

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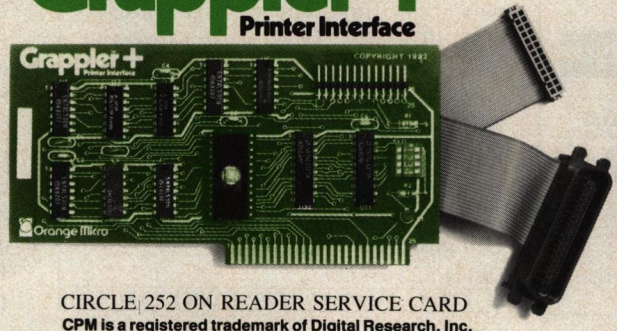

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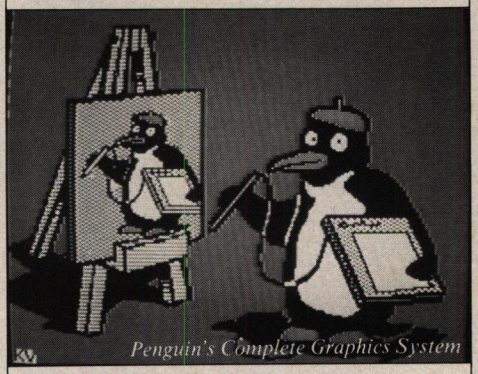

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MISCELLANEOUS

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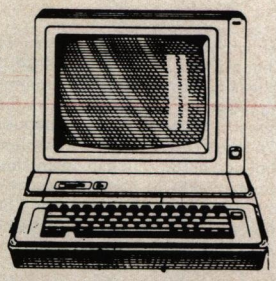

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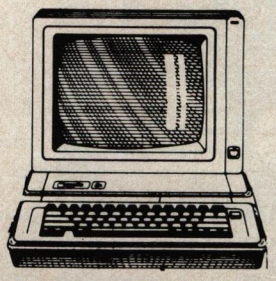

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C. Itoh Cut Sheet Feeder	$450.00
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Epson FX-80 160cps	$499.00
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Okidata 92ml 160cps	$425.00
Okidata 93ml 200cps (15" Carr)	$725.00
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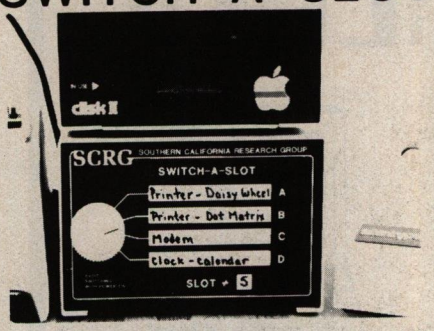
SCRG PRODUCTS FOR THE APPLE COMPUTER

SWITCH-A-SLOT



The **SWITCH-A-SLOT** is an expansion chassis, which allows the user to plug in up to four peripheral cards at one time. One of these cards is selected for use, and only that card draws power.

This product is especially useful where the software requires the printer to be in a particular slot, and the user wishes to choose between two or more printers.

- Allows up to four peripheral cards to be plugged into one peripheral slot.
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- 18" cable connects Switch-a-slot to computer.

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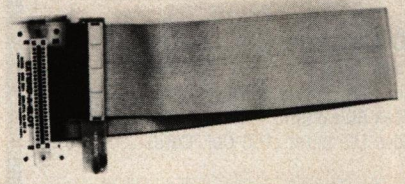
SWITCH-A-SLOT and EXTEND-A-SLOT work well with all slow to medium speed cards, such as Modems, Printers, Clock, 80 Column, Music, etc. They are not recommended for high speed data transfer devices such as disk drive controllers, alternate processor, and memory cards. These products may be incompatible with some alternate processor cards.

EXTEND-A-SLOT



The **EXTEND-A-SLOT** brings a slot outside your APPLE™, allowing an easy change of cards. The 18" flex cable is long enough to allow placement of the card in a convenient location. The high quality connectors are gold plated for reliability.

The perfect accessory for:

Owners of large numbers of I/O expansion cards—keep your frequently used cards installed. Use the EXTEND-A-SLOT for the others.

Technicians—easy access to test points on accessory cards under actual operating conditions.

Experimenters—make easy changes to cards while card is installed.

EASY TO USE—just plug it in as you would any expansion card, then plug your card in. When you want to change cards, do it easily outside the computer, without the wear and tear on the computer expansion slot.

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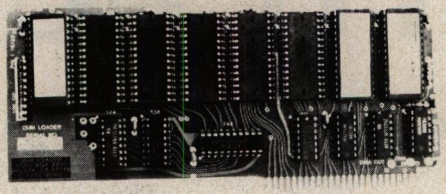
quikLoader™



Designed by Jim Sather

SPEED

The quikLoader is the *fastest* way to load programs, ***BAR NONE!*** Applesoft, Integer, or machine language programs can be loaded in fractions of a second. More importantly, DOS is instantly loaded every time the computer is turned on. Integer is even loaded in the language card. This process takes less than a second, saving valuable time. The quikLoader operating system can keep track of over 250 programs stored in **PROM**s (Programmable Read Only Memory). The user simply transfers any of these programs to PROM using the instructions packed with the unit, and any PROM programmer, or we will provide this service.

CONVENIENCE

How many times have you started to work with a frequently used program, only to find that you have misplaced the disk, or worse, had the disk damaged, or the dreaded "I/O ERROR" message flash on the screen. With the quikLoader, these nightmares can be a thing of the past. Frequently used programs are available *instantly* when you need them, without having to look for the disk, or hoping that the lengthy disk loading procedure goes smoothly. If you do need to use standard disks, the quikLoader even speeds up that process. For example, to catalog a disk, just press ctrl-C Reset. To run the "HELLO" program, press crtl-H Reset.Other "one-key" commands include entering the monitor, booting the disk, calling up the mini-assembler, etc. The major difference between the quikLoader and the other ROM cards is the complete operating system (in PROM). This enables you to get the quikLoader catalog on the screen (by pressing ctrl-Q Reset), allowing you to see what programs are available. Loading or running of the desired program requires one keypress. Program parameters, such as starting address and length of machine language programs can be seen on the catalog screen, if desired.

VERSATILE

The quikLoader will accept any of the popular PROMS available on the market, 2716, 2732, 2764, 27128 and 27256. These types may be freely intermixed on the card. Long programs can take up more than one PROM, or several short programs may be stored on one PROM. The quikLoader operating system even handles multiple cards, so you can easily double or triple the amount of PROM memory available. The ultimate memory capacity of one card is 256K, so many frequently used programs and utilities can be stored. We even start your library of programs with the most popular utilities on the card, FID and COPYA. Now, if you have to copy a disk, you don't have to search for the master disk. You can start copying within 3 seconds after turning on the computer.

INCREASED DISK CAPACITY

Since DOS is loaded from the quikLoader every time the computer is turned on, it is not necessary to take up valuable disk space with DOS. This will give you more than 10% additional space for programs and data on your disks.

SYSTEM REQUIREMENTS

The quikLoader plugs into any slot of the APPLE] [+ or //e. If used in a] [+, a slightly modified 16K memory card is required in slot 0. A disk drive is required to save data.

DOS, INTEGER BASIC, FID, and COPYA are copyrighted programs of APPLE COMPUTER, INC. licensed to Southern California Research Group to distribute for use only in combination with quikLoader.

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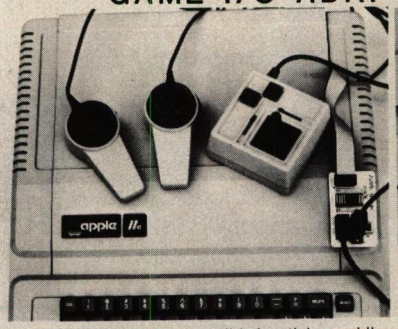

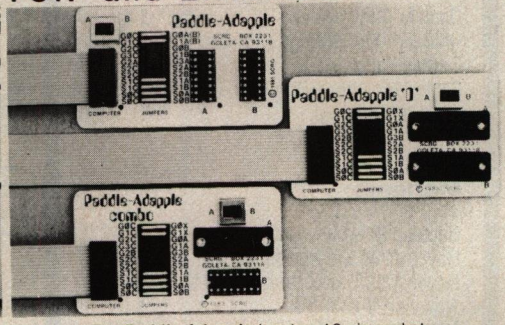

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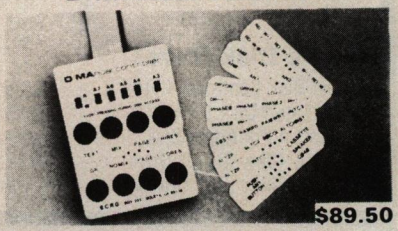

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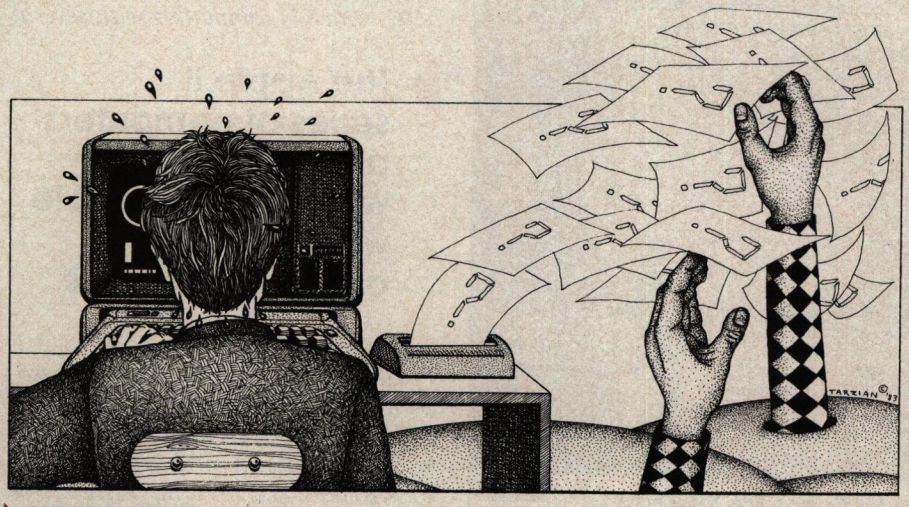
RESCUE SQUAD
BY FREDERIC E. DAVIS
Questions from our readers



USING BOTH SIDES

Q. I have an Apple IIe with two Apple Disk II drives, and I am using DOS 3.3 and CP/M with 5¼-inch single-sided, single-density diskettes. I've heard of a diskette called a "flippy-floppy" that will let me store twice as much information. What are flippy-floppies, and where can I get them?

A. Flippy-floppy *describes a diskette that has been modified for use on both sides in a single-sided drive. Most disk drives used with the Apple II series—such as the Disk II drive and the new DuoDisk—are single-sided drives, which means that they can read from and write to only one side of a diskette at a time. To use the other side of a diskette with a single-sided drive, you must take the diskette out of the drive, flip it over, and reinsert it in the drive; hence the name* flippy-floppy.

A disk that doesn't show any errors on the flip side is all right to use.

It's not that simple, however. If you buy a single-sided diskette, only one side of the diskette is certified as being free from defects. The other side might have a defect that could cause errors, or it might not. Because such an error could have disastrous consequences, though, it's not a good idea to use the other side of a single-sided diskette without testing it first.

If you are using DOS 3.3, you can check the other side of the diskette for defects by using the "disk surface certify" option on Locksmith or a similar DOS utility. A disk that doesn't show any errors on the flip side is all right to use, but one that shows even a single error should not be used on that side. If you are using CP/M, a public-domain program called Findbad identifies bad sectors on the diskette and prevents the computer from using them. You lose a little storage space on the bad side, but you can still use that side. The best solution is to buy double-sided diskettes, since these are certified for use on both sides.

Another problem to overcome when you use flippy-floppies involves the write-protect notch, which is located near the top of the right side of the diskette (with the label at the top, facing you). When this notch is exposed, the computer can read from and write to the diskette. When the notch is covered with a small tab (called a "write-protect tab") or with a small piece of tape, then the diskette becomes "read-only," which means it can only be read from by the computer, not written to. When you flip a standard diskette over, the write-protect notch is on the wrong side, and the computer can not initialize, format, or write to the diskette. To solve this problem, punch a notch in the corresponding place on the opposite side of the diskette. You can use a paper punch if you are careful, but I recommend buying a special diskette notcher, such as the Overbyte, Nibble-notcher, or Etc-Soi. These devices have a special guide that ensures the correct placement of the notch on the diskette.

SOFTWARE COMPATIBILITY

Q. I have been using an Apple IIe at work for word processing and spreadsheets. I recently bought an Apple IIc for use at home. The other day I brought home my WordStar, dBASE II, and VisiCalc programs to do some work. The VisiCalc program worked fine, but the WordStar and dBASE diskettes wouldn't even boot. I thought it might be a case of bad diskettes, but the programs were fine when I brought them back to the office and ran them on the IIe. What's the problem with my IIc?

To use programs that run under CP/M you need a special add-on circuit board with a Z80 microprocessor in your computer.

A. *The problem is not with your IIc. You can't run WordStar or dBASE because these two programs require the CP/M operating system, which is not compatible with either the IIe or the IIc, as sold by Apple. In order to use programs that run under CP/M you need a special add-on circuit board with a Z80 microprocessor in your computer. Popular Z80 cards include the Microsoft SoftCard and the Digital Research Gold Card. The IIe that you have at work evidently has one of these add-on processor cards plugged into an expansion slot inside the com-*

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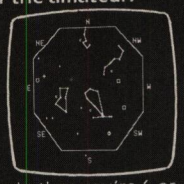

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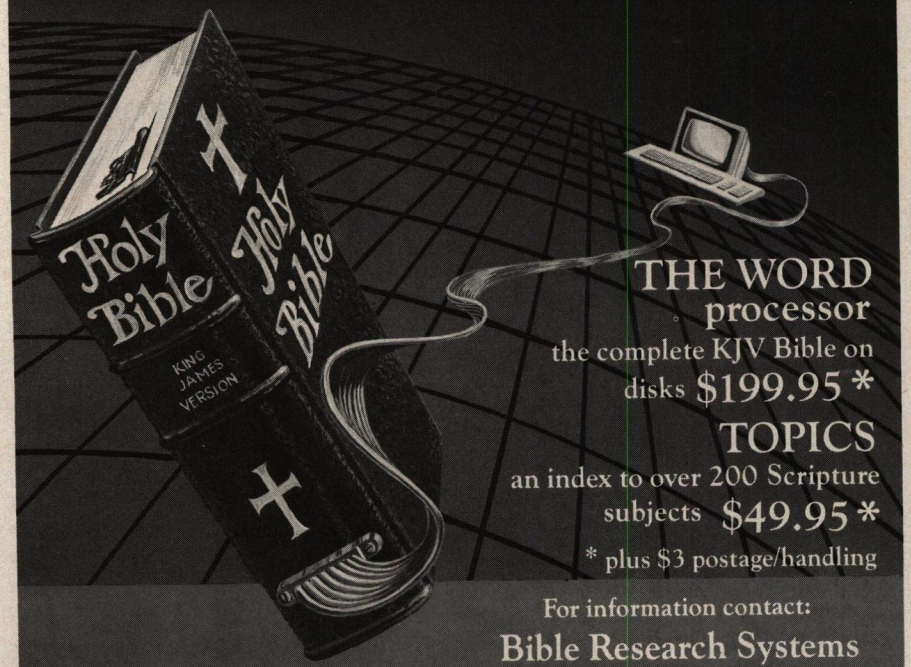

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puter. The Apple IIc lacks expansion slots for add-on microprocessors; it is currently not possible, therefore, to add a Z80 card and run programs—such as WordStar and dBASE—that require the CP/M operating system.

If you want to do word processing or database management on your IIc, you must use programs that operate with the 6502 type of microprocessor. The Apple II series of computers all use the 6502, which is compatible with several operating systems, such as DOS 3.3, ProDOS, and Pascal. For word processing, use Apple Writer II, Bank Street Writer, or HomeWord; for database management, use PFS:File and PFS:Report, VersaForm, VisiFile, or DB Master. Or you could use the new AppleWorks integrated software package that combines, in one program, word processing, database management, and an electronic spreadsheet.

The Apple II series of computers all use the 6502, which is compatible with several operating systems.

HELP FOR THE DISABLED

Q. I am the mother of a cerebral-palsied daughter and read with great interest your article about computers and the handicapped in the January issue of *A+*. We own an Apple II, but our child is unable to use it because of the condition of her hands. Would you be able to provide me with more specific information about how persons with cerebral palsy can use the Apple?

A. *Apple Computer, Inc., publishes a resource guide called* Personal Computers for the Disabled *that is available from Apple Computer, Inc., 20525 Mariani Avenue, Cupertino, CA 95104. The University of Wisconsin's Trace Research and Development Center—314 Waisman Center, Madison, WI 53706—is studying the problems of the disabled and computers. Finally, for inspiration, you might like to contact Hal Glicksman, 1303 9th Street, Santa Monica, CA 90401, whose son, John, has cerebral palsy and is using an Apple II computer to great advantage.* ✚

Please send your questions and problems to Rescue Squad, A+, 11 Davis Drive, Belmont, CA 94002.

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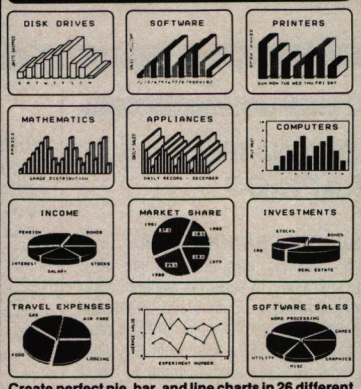

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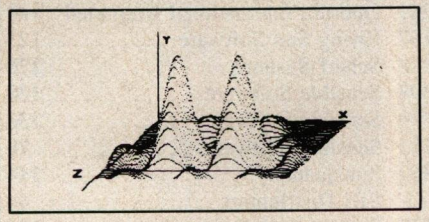

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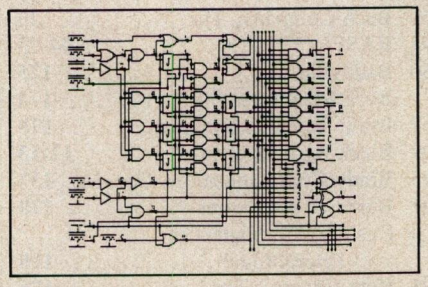

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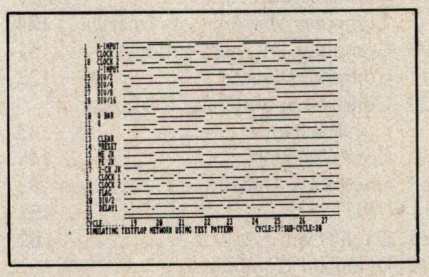

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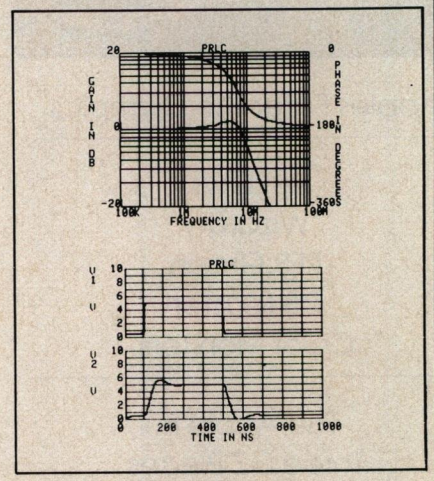

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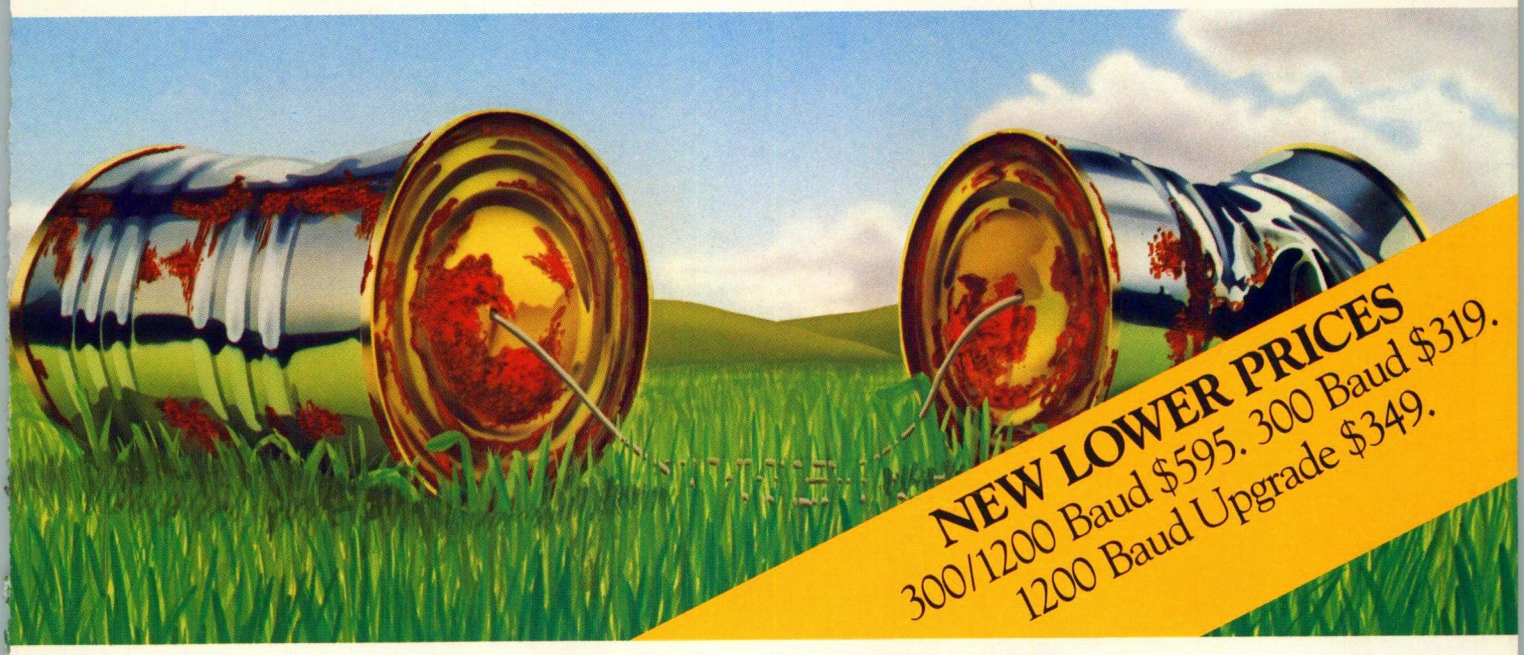

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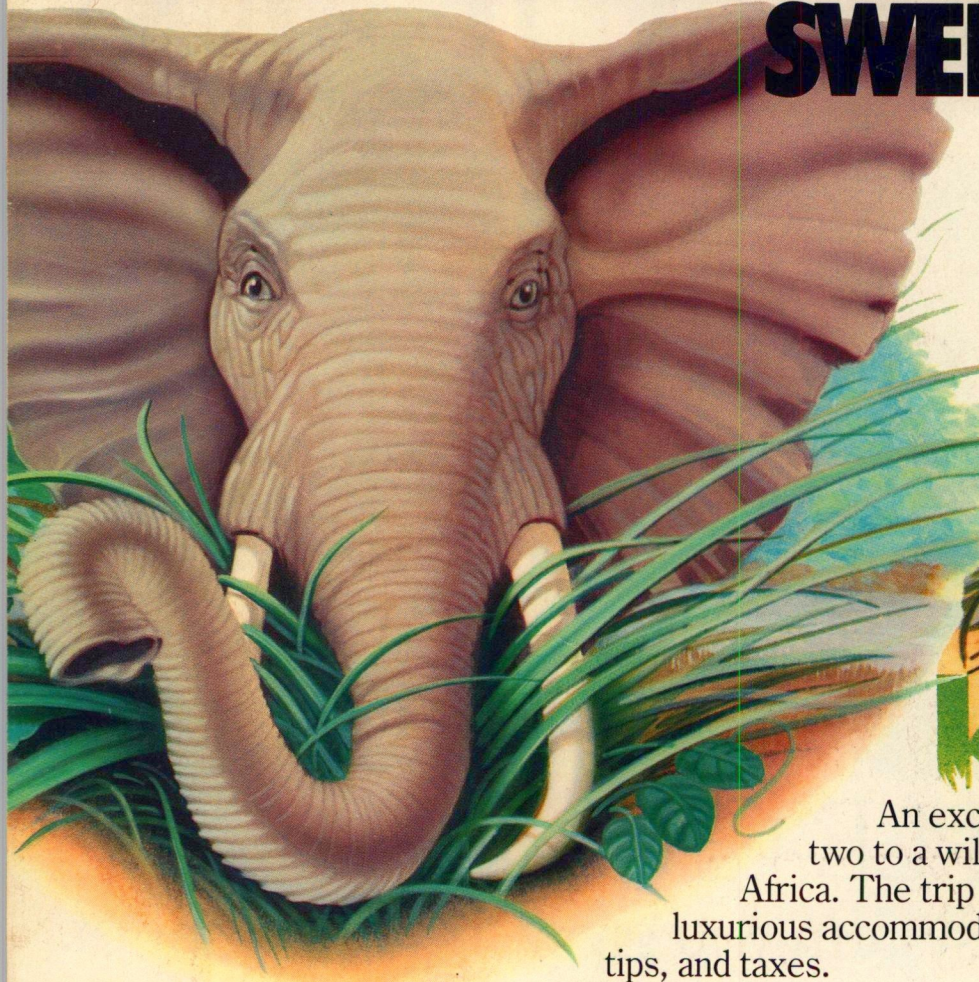

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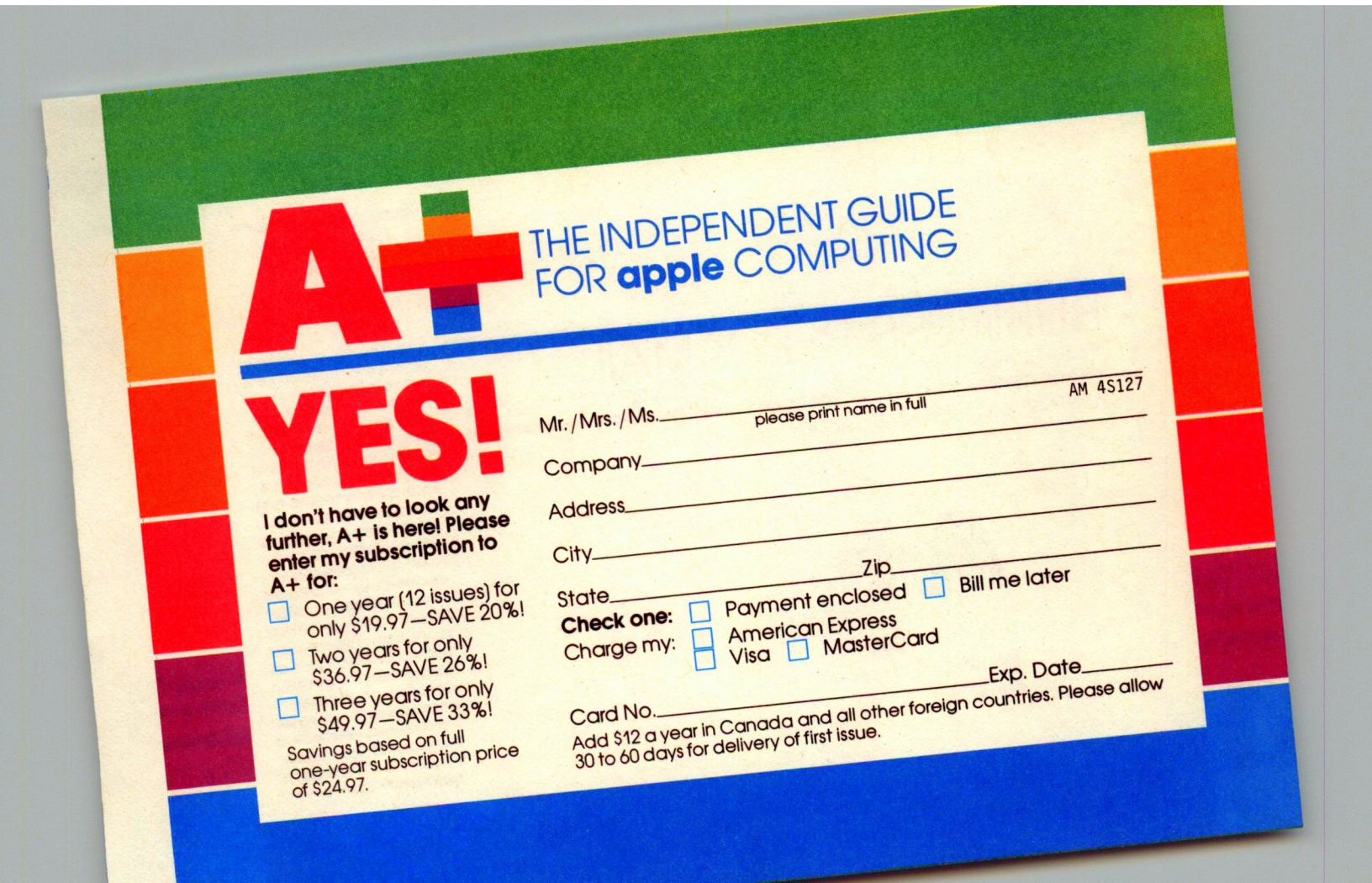
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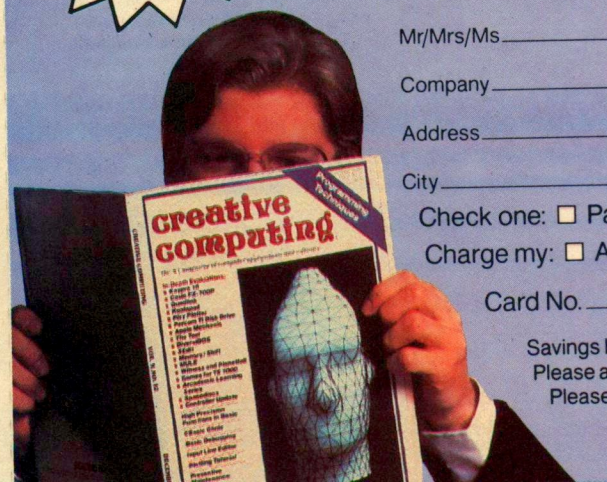

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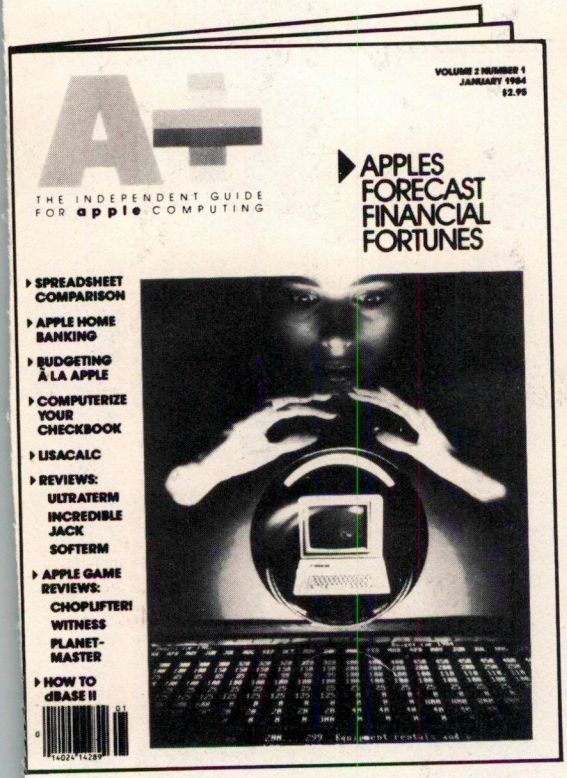

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